

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US05/07748

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) : C12Q 1/68; C07H 21/04

US CL : 435/6; 536/23.1, 23.5

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 435/6; 536/23.1, 23.5

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
Please See Continuation Sheet

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5,776,683 A (SMITH et al) 07 July 1998 (07.07.1998), especially col. 6, 25 and Table 7.	1-4
Y	SQUIRE et al. High-resolution mapping of amplifications and deletions in pediatric osteosarcoma by use of CGH analysis of cDNA microarrays. Genes, Chromosomes & Cancer. 2003, Vol. 38, pages 215-225, especially page 216 and Table 1.	1-4

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"B" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

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## Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:  
Please See Continuation Sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of any additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.: 1-4, with respect to the amplicon comprising chromosome 8q24.13

- Remark on Protest ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐

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### BOX III. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be searched, the appropriate additional examination fees must be paid.

Groups 1-47, claims 1-4 (in part), drawn to methods for identifying an antineoplastic agent by contacting a test compound with a cell containing one of the 47 amplicons set forth in Table 2. For example, Group 1 is drawn to methods for identifying an antineoplastic agent by contacting a test compound with a cell containing the 5.3 MB amplicon comprising chromosome 8q24.13. Upon election of one of the groups, please specify the amplicon to be searched.

Groups 48-3097, claims 5-9 (in part), drawn to methods for identifying an antineoplastic agent by contacting a test compound with a cell containing one of the sequences of SEQ ID NO: 1-3049 and assaying for a change in the level of expression of one of the sequences. For example, Group 48 is drawn to methods for identifying an antineoplastic agent by contacting a test compound with a cell containing SEQ ID NO: 1. Upon election of one of the groups, please specify the SEQ ID NO of the elected group to be searched.

Groups 3098-6147, claims 10-11 (in part), drawn to methods for identifying a cancerous state of a cell by assaying for the sequence of one of SEQ ID NO: 1-3049. Upon election of one of the groups, please specify the SEQ ID NO of the elected group to be searched.

Groups 6148-9196, claims 12-34 (in part), drawn to methods for identifying an antineoplastic agent by contacting a test compound with a cell containing a polypeptide encoded by one of the sequences of SEQ ID NO: 1-3049 and assaying for a change in the activity of the polypeptide. Upon election of one of the groups, please specify the SEQ ID NO of the elected group to be searched. Further, it is noted that claim 23 has been included with this grouping because it appears that claim 23 intends to depend from claim 15, rather than claim 11.

Groups 9197-12,245, claims 35-39 (in part), drawn to methods for identifying an antineoplastic agent by contacting a test compound with a cell containing one of the sequences of SEQ ID NO: 1-3049 and assaying for a change in the cancer cell growth of said cell. Upon election of one of the groups, please specify the SEQ ID NO of the elected group to be searched.

Groups 12,246-15,294, claims 40-47 (in part), drawn to methods for treating cancer by using a compound that effects the activity of a polypeptide encoded by one of the sequences of SEQ ID NO: 1-3049. Upon election of one of the groups, please specify the corresponding SEQ ID NO of the elected group to be searched.

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Groups 15295-18343, claims 48-55 and 57-60 (in part), drawn to methods for monitoring the progress of a cancer therapy by assaying for the level of a polypeptide encoded by one of the sequences of SEQ ID NO: 1-3049. Upon election of one of the groups, please specify the SEQ ID NO of the elected group to be searched.

Groups 18,344-21,392, claim 56 (in part), drawn to methods for producing data comprising producing test data sufficient to identify the chemical nature of a test compound that effects the activity of a polypeptide encoded by one of the sequences of SEQ ID NO: 1-3049. Upon election of one of the groups, please specify the SEQ ID NO of the elected group to be searched.

The inventions listed as Groups 1-21,392 do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

In accordance with 37 CFR 1.475(d) Applicant is entitled to an examination of the first product, method of making said product and method of using said product. In the instant case, the first method is one which requires one of the 47 amplicons of Table 2. This product is not required for the methods set forth in the remaining groups. Thereby, Groups 48-21,392 constitute distinct groups which do not share the same corresponding technical feature of groups 1-47. Further, unity of invention exists only when there is a technical relationship among those inventions involving one or more of the same or corresponding technical features. The expression "special technical feature" means those technical features that define a contribution which each of the claimed inventions, considered as a whole, makes over the prior art. The technical feature linking the claims 5-60 is the HAS2 gene. However, the HAS2 gene was known in the art at the time the invention was and thereby does not constitute a contribution over the prior art (see NCBI Database, GenBank Accession No. U54804). Accordingly, there is no special technical feature linking the recited groups, as would be necessary to fulfill the requirement for unity of invention.

It is also noted that each of the present claims has been presented in improper Markush format, as distinct methods are improperly joined in the claims. Each amplicon of Table 2 and each nucleic acid sequence of SEQ ID NO: 1-3049 is structurally and functionally distinct from and has a different special technical feature than each other the amplicons and nucleic acid sequences. The chemical structure of each amplicon and nucleic acid sequence differ from each other. For example, a polynucleotide comprising SEQ ID NO: 1 is chemically, structurally, and functionally different from a molecule comprising SEQ ID NO: 2. Given the differences in the structure, function and effect the amplicons of Table 2 and the sequences of SEQ ID NO: 1-3049, these compounds are not considered to share a special technical feature as would be necessary to fulfill the requirement for unity of invention. These distinct compounds do not have both a "common property or activity" and a common structure as would be required to show that the inventions are "of a similar nature." As the products and methods encompassed by the claims do not share a special technical feature, the distinct products and methods may not properly be presented in the alternative. Accordingly, the claims have been separated into a number of groups corresponding to the number of different inventions encompassed by the claims, and the claims will be searched only as they read upon the invention of the elected group.

Additionally, each of the claimed methods have different objectives and require different process steps. The methods of claims 1-4 require cells containing one of the amplicons of Table 2 and requires assaying for a change in the amplification ratio of the amplicon. The methods of claims 5-9 require the use cells that contain one of the sequences of SEQ ID NO: 1-3049, and requires assaying for a change in gene expression by assaying for mRNA or protein levels in order to accomplish the objective of identifying an antineoplastic agent. The methods of claims 10-11 require assaying for the level of one of the sequences of SEQ ID NO: 1-3049 in order to accomplish the objective of identifying a cancerous state of a cell. The methods of claims 12-34 require contacting a cell with a test agent and assaying for a change in biological activity of a polypeptide encoded by SEQ ID NO: 1-3049. The methods of claims 35-39 require contacting a cell with a test compound and assaying for the cancerous state of a cell. The methods of claims 40-47 require administering an agent to an individual in order to accomplish the objective of treating cancer. The methods of claims 48-55 and 57-60 require determining gene expression levels of a polypeptide of one of SEQ ID NO: 1-3049 and assaying for polypeptide levels in order to accomplish the objective of monitoring the progress of cancer therapy. The method of claim 56 requires identifying test compounds that have

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antineoplastic activity and producing test data in order to obtain sufficient data to identify the chemical structure of the test compound. In addition to differences in objectives, effects, and method steps, it is again noted that the claims of the present Groups are not directed to the detection or identification of molecules having the same or common special technical feature, for the reasons discussed above.

Continuation of B. FIELDS SEARCHED Item 3:

WEST: USPT, JPAB, EPAB, DWPI, PGPUB; DIALOG: MEDLINE, CA, BIOSIS, EMBASE

search terms: 8q24.13, 8q24.1; amplification or amplified or copy number; cancer or tumor or neoplasm

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**Declaration under Rule 4.17:**

— of inventorship (Rule 4.17(iv)) for US only

**Published:**

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— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: DETERMINING CANCER-LINKED GENES AND THERAPEUTIC TARGETS USING MOLECULAR CYTOGENETIC METHODS

(57) Abstract: Methods for identifying antineoplastic agents by using their ability to modify expression of specific genes or the biological activity of polypeptides encoded by such genes, wherein said genes are located in specific chromosomal regions, called amplicons, or regions of interest, and the presence of such amplified regions within a cancerous cell, are disclosed. Also described are methods for diagnosing cancerous, or potentially cancerous, conditions using these methods. Also encompassed are methods involving determining the modulated expression of the genes in these regions of interest (ROIs), or amplicons, as pharmacodynamic/pharmacogenetic/surrogate markers and/or for patient profiling prior to accrual for clinical trials/treatments based on the identification of these genes as validated gene/drug targets in various cancer tissue types.

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# **DETERMINING CANCER-LINKED GENES AND THERAPEUTIC TARGETS USING MOLECULAR CYTOGENETIC METHODS**

5

This application claims priority of U.S. Provisional Application Serial  
No. 60/550,304, filed 8 March 2004, the disclosure of which is hereby  
10 incorporated by reference in its entirety.

## **FIELD OF THE INVENTION**

15

The present invention relates to Identification of amplifications / gains  
of genomic segments of DNA within human chromosomes in diseased states,  
such as cancer, that are demarcated and limited within specific chromosomal  
20 bands and defined herein as "amplicons" and whose disruption and/or change  
in expression is useful to distinguish cancerous from non-cancerous tissue  
and serve as potential therapeutic targets, pharmacodynamic  
/pharmacogenetic/surrogate and prognostic and diagnostic markers.

25

## **BACKGROUND OF THE INVENTION**

Malignant tumors are a leading cause of death in the United States and  
30 one in four Americans is likely to die of cancer. This disease is often  
characterized by an increase in the number of abnormal, neoplastic cells that  
are ultimately derived from a normal tissue after which the cells proliferate to  
form a tumor, which can then metastasize (spreading into adjacent tissues or  
traveling elsewhere in the body via the bloodstream or lymphatic system).

35

The genomes of various well-studied tumors carry several different independently altered genes, including activated oncogenes and inactivated tumor suppressor genes. Chromosomal abnormalities have been identified in most cancer cells. Conventional chromosome banding techniques allow for the detection of specific chromosomal defects in tumor cells but interpretation of the banding pattern is sometimes difficult, particularly when complex chromosomal rearrangements or subtle abnormalities are present. In recent years, new techniques, such as CGH and SKY, based on fluorescent *in situ* hybridization (FISH) (Pinkel et al., Proc Nat Acad Sci USA 85:9138-42 (1988)) have been developed to overcome the limitations of conventional chromosome banding. CGH measures intensities of fluorescently labeled tumor DNA and normal DNA following hybridization to normal chromosomes (Kallioniemi et al., Science 258:818-21 (1992)). Gain or loss of copy number of a particular chromosome or chromosome region in the tumor DNA is determined by the relative intensity of a fluorescence ratio. SKY utilizes a cocktail of chromosome probes, fluorescently labeled to specify each chromosome, which is hybridized to tumor chromosomes in an effort to identify numerical and structural abnormalities in the tumor cell (Schröck et al., Science 273:494-7 (1996)). CGH and SKY have been used to identify chromosomal regions that harbor genes significant to the process of tumor initiation or progression.

The identification of amplifications of genomic DNA within well defined and demarcated limits on human chromosomes is done at a resolution of human chromosome banding limited to 400-550 bands by the technique of Comparative Genomic Hybridization (CGH). The present invention applies custom protocols to obtain human template chromosomes that are resolved to 850 to 1000 band resolution of human chromosomes (ISCN, 1985), to perform CGH on a large number of cell lines/ tissue samples/tumor cells. This allows the identification of regions of genomic DNA amplifications ranging from 2-5 Mbp at the highest limits of resolution of human chromosomes, detected by fluorescent intensity evaluations performed at the microscope.



Amplicons, or regions of interest,, from 10-20 Mb and more are also defined by these methods. These amplicons contain a gene, or genes, that are amplified (meaning copy number gains), and/or differentially expressed in the tissue/ cells of origin. Genes identified as being amplified and/or over-expressed provide targets for intervention with a small molecular therapeutic, antibodies, anti-sense or other therapeutic modalities. A gene or genes within these regions could also be used for diagnostic or prognostic molecular pathology characterization and useful as pharmacodynamic biomarkers for drug response profiling and patient sub-set selection and stratification.

10

### BRIEF SUMMARY OF THE INVENTION

In one aspect the present invention relates to a set of genes that have been localized within human chromosomal regions of interest (ROI) that have been identified by molecular cytogenetic techniques. In particular, the present invention relates to chromosomal regions of interest, or amplicons, that are summarized in Table 1 and containing genes corresponding to cDNA sequences shown in the sequence listing described herein.

20

In another aspect, the present invention relates to a method for diagnosing the presence of a cancerous condition, or diagnosing a predisposition to developing a cancerous condition, in an animal, especially a human being, by determining the amplification and/or over-expression, of one or more genes corresponding to SEQ ID NO: 1-3049 in a cell, or tissue sample, obtained from an animal. The animal may be afflicted with, or at risk of developing, such a cancerous condition, or otherwise predisposed to develop such a condition.

30

In a further aspect, the present invention relates to a method for the treatment of a cancerous condition, especially one involving breast, colon, lung, cervix, kidney, pancreas and prostate tissues, utilizing selected chemical

agents having anti-tumor activity as identified using one of the assays disclosed herein.

Thus, in one aspect the present invention relates to a method for identifying an antineoplastic agent, comprising:

5 (a) contacting a test compound with a cell that expresses at least one gene corresponding to a polynucleotide comprising a nucleotide sequence of SEQ ID NO: 1 - 3049 and under conditions promoting expression of said gene; and

10 (b) determining a change in expression of said gene as a result of said contacting

wherein a change in expression indicates gene modulation thereby identifying said test compound as a gene modulating agent. In a preferred embodiment thereof, the change in expression is a decrease in expression.

15 In a further aspect, the present invention relates to a method for identifying a compound as an anti-neoplastic agent, comprising:

(a) contacting a test compound with a polypeptide encoded by a gene selected from SEQ ID NO: 1 – 3049,

20 (b) determining a change in a biological activity of said polypeptide due to said contacting,

wherein a change in activity indicates anti-neoplastic activity and thereby identifies such test compound as an agent having antineoplastic activity.

25 Preferably, the change in biological activity is a decrease in biological activity. Also preferred is where the biological activity is an enzyme activity, most preferably involving an enzyme selected from kinase, protease, peptidase, phosphodiesterase, phosphatase, dehydrogenase, reductase, carboxylase, transferase, deacetylase and polymerase. Also preferred is a  
30 biological activity that is a membrane transport activity, an integrin, a Cytochrome P450 enzyme, a nuclear hormone receptor, or a receptor activity,

such as a G-protein-coupled receptor. In other preferred embodiments, the polypeptide is contained in a cell.

5           The present invention also relates to a method for treating cancer comprising contacting a cancerous cell with an agent first identified as having gene modulating activity using any of the methods of the invention and in an amount effective to cause a reduction in cancerous activity of said cell. In a preferred embodiment, said cancerous cell is contacted *in vivo*, as where the  
10   agent is administered to a mammal, especially a human being, afflicted with cancer and in an amount sufficient to ameliorate the cancer.

          The present invention further relates to a method for treating cancer comprising contacting a cancerous cell with an agent having affinity for an  
15   expression product of a gene corresponding to a polynucleotide comprising a nucleotide sequence of SEQ ID NO: 1 – 3049 and in an amount effective to cause a reduction in cancerous activity of said cell. Preferably, the expression product is a polypeptide and the agent is an antibody.

20           The present invention also relates to a method for monitoring the progress of cancer therapy in a patient comprising monitoring in a patient undergoing cancer therapy the expression of a gene corresponding to a polypeptide having a sequence selected from SEQ ID NO: 1 – 3049, preferably wherein the gene comprises a sequence of SEQ ID NO: 1 – 3049,  
25   such as where the cancer therapy is chemotherapy.

          In a further embodiment, the present invention relates to a method for determining the likelihood of success of cancer therapy in a patient, comprising monitoring in a patient undergoing cancer therapy the expression  
30   of a gene corresponding to a polynucleotide having a sequence of one or SEQ ID NO: 1 – 3049 wherein a decrease in said expression prior to completion of said cancer therapy is indicative of a likelihood of success of said cancer

therapy, preferably wherein the gene comprises a sequence of SEQ ID NO: 1-3049 and wherein the cancer therapy is chemotherapy.

5 The present invention still further relates to a method for determining the progress of a treatment for cancer in a patient afflicted therewith, following commencement of a cancer treatment on said patient, comprising:

- (a) determining in said patient a change in expression of one or more genes corresponding to a polynucleotide comprising a nucleotide sequence of SEQ ID NO: 1 – 3049; and
- 10 (b) determining a change in expression of said gene compared to expression of said one or more determined genes prior to commencement of said cancer treatment;

wherein said change in expression indicates progress of said treatment thereby determining the progress of said treatment. Preferred embodiments

15 include where the change in expression is a decrease in expression and said decrease indicates success of said treatment.

20

## DEFINITIONS

As used herein, the following terms have the indicated definition unless expressly stated otherwise.

25 The term "amplicon" refers to regions of interest, i.e., genomic segments of DNA within human chromosomes in diseased states like cancer that are demarcated and limited within specific chromosomal bands. Since these amplicons contain sequences of a gene/ or genes that are amplified (copy number gains), and/ or differentially expressed in the tissue/ cells of

30 origin, a listing of these genes within the amplicons detected are listed in Table 3. Genes identified as being amplified and/or over-expressed within the amplicons provide a useful target for intervention with small/large

molecule/protein/antibody therapeutics, anti-sense or other therapeutic modalities. A gene or genes within these regions is also useful for diagnostic or prognostic molecular pathology characterization/companion diagnostics, and useful as pharmacodynamic biomarkers for drug response profiling and patient sub-set selection and stratification.

The term "percent identity" or "percent identical," when referring to a sequence, means that a sequence is compared to a claimed or described sequence after alignment of the sequence to be compared (the "Compared Sequence") with the described or claimed sequence (the "Reference Sequence"). The Percent Identity is then determined according to the following formula:

$$\text{Percent Identity} = 100 [1 - (C/R)]$$

15

wherein C is the number of differences between the Reference Sequence and the Compared Sequence over the length of alignment between the Reference Sequence and the Compared Sequence wherein (i) each base or amino acid in the Reference Sequence that does not have a corresponding aligned base or amino acid in the Compared Sequence and (ii) each gap in the Reference Sequence and (iii) each aligned base or amino acid in the Reference Sequence that is different from an aligned base or amino acid in the Compared Sequence, constitutes a difference; and R is the number of bases or amino acids in the Reference Sequence over the length of the alignment with the Compared Sequence with any gap created in the Reference Sequence also being counted as a base or amino acid.

If an alignment exists between the Compared Sequence and the Reference Sequence for which the percent identity as calculated above is about equal to or greater than a specified minimum Percent Identity then the Compared Sequence has the specified minimum percent identity to the Reference Sequence even though alignments may exist in which the

hereinabove calculated Percent Identity is less than the specified Percent Identity.

As used herein, the terms "portion," "segment," and "fragment," when used in relation to polypeptides, refer to a continuous sequence of residues, such as amino acid residues, which sequence forms a subset of a larger sequence. For example, if a polypeptide were subjected to treatment with any of the common endopeptidases, such as trypsin or chymotrypsin, the oligopeptides resulting from such treatment would represent portions, segments or fragments of the starting polypeptide. When used in relation to a polynucleotide, such terms refer to the products produced by treatment of said polynucleotides with any of the common endonucleases, or any stretch of polynucleotides that could be synthetically synthesized.

As used herein, the term "DNA segment" or "DNA sequence" refers to a DNA polymer, in the form of a separate fragment or as a component of a larger DNA construct, which has been derived from DNA, and may include both single stranded and duplex sequences. Such segments are provided in the form of an open reading frame uninterrupted by internal non-translated sequences, or introns, which are typically present in eukaryotic genes.

The term "coding region" refers to that portion of a gene which either naturally or normally codes for the expression product of that gene in its natural genomic environment, i.e., the region coding *in vivo* for the native expression product of the gene.

The term "nucleotide sequence" refers to a heteropolymer of deoxyribonucleotides. Generally, DNA segments encoding the proteins provided by this invention are assembled from cDNA fragments and short oligonucleotide linkers, or from a series of oligonucleotides, to provide a synthetic gene which is capable of being expressed in a recombinant

transcriptional unit comprising regulatory elements derived from a microbial or viral operon.

5 The term "expression product" means that polypeptide or protein that is the natural translation product of the gene and any nucleic acid sequence coding equivalents resulting from genetic code degeneracy and thus coding for the same amino acid(s).

10 The term "fragment," when referring to a coding sequence, means a portion of DNA comprising less than the complete coding region whose expression product retains essentially the same biological function or activity as the expression product of the complete coding region.

15

## DETAILED SUMMARY OF THE INVENTION

20 The present invention relates to a set of genes that are amplified and/or over-expressed genes in cancer cell lines and have been localized to various chromosomal regions of interest. These genes have been identified through a combination of CGH, SKY, expression analysis and Reverse Transcriptase-Polymerase Chain Reaction (RT-PCR). Such genes are both markers and potential therapeutic targets for cancer, in particular breast; colon, lung and prostate malignancies. In addition, the amplified nature of  
25 such genes provides a means of diagnosing a cancerous condition, or predisposition to a cancerous conditions, by determining the amplification of one or more of such genes in a patient afflicted with, or predisposed toward, or otherwise at risk of developing, cancer.

30 In one aspect the present invention relates to a set of genes that have been localized within human chromosomal regions of interest (ROI) that have been identified by molecular cytogenetic techniques. In particular, the present

invention relates to chromosomal regions of interest, or amplicons, that are summarized in Table 1. Table 2 lists tissues where the amplicons are found, cell lines expressing them, the amplification ratios found in those tissues for cancer versus normal cells, amplicon size and the chromosomal locations of the amplicons. Table 3 lists the chromosomal locations and accession number identifications of these regions of interest and which serve to correlate amplicons with the cDNA sequences of SEQ ID NO: 1-3049.

Table 1 - List of Amplicons

AMPLICON	CHR	BPSTART	BPEND	BPLENGTH
A1	8	122000000	127500000	5500000
A2	13	96500000	100000000	3500000
A3	5	175000000	181500000	6500000
A4	13	26500000	34000000	7500000
A5	7	101000000	106000000	5000000
A6	10	73500000	82500000	9000000
A7	7	71000000	77500000	6500000
A8	1	116500000	120000000	3500000
A9	6	36000000	41000000	5000000
A10	18	70500000	76500000	6000000
A11	9	9000000	18500000	9500000

25

For Table 1, CHR means chromosome number, BPLENGTH represents the number of nucleotides in the amplicon. BPSTART refers to "base pair start point" and BPEND refers to "base pair end point" along the chromosome based on the July 2003 human reference sequence UCSC version hg16 (NCBI Build 34).

35



Table 2. Amplicon Locations

cell line	Amp #	tissue	chrom	band start	band stop	Ratio	amplicon size MB
HCC1954	A1	Breast	8	q24.13	q24.13	14	5.3
NCI_H446	A1	scLung	8	q24.13	q24.21	8	8.3
NCI_H827	A1	scLung	8	q24.13	q24.21	6	8.3
HCC202	A1	Breast	8	q24.13	q24.21	6	8.3
NCI_H82	A1	scLung	8	q24.13	q24.13	7	5.3
NCI_H23	A1	nscLung	8	q24.13	q24.13	7	5.3
MDA_MB436	A2	Breast	13	q32.2	q32.3	6	5.3
NCI_H1963	A2	scLung	13	q32.3	q32.3	6	3.3
EFM192A	A2	Breast	13	q32.3	q34	8	18.8
MDA_MB157	A2	Breast	13	q32.3	q34	5	18.8
HCC1937	A2	Breast	13	q32.3	q32.3	4	3.3
SKBR3	A2	Breast	13	q32.3	q32.3	4	18.8
NCI_H1963	A2	nscLung	13	q32.3	q32.3	6	3.3
HCC1954	A3	Breast	5	q35.3	q35.3	4	4.3
MDA_MB436	A3	Breast	5	q35.1	q35.3	7	14
BT20	A4	Breast	5	q35.1	q35.3	4	14
KPL1	A5	Breast	5	q35.1	q35.3	4	14
HCC3153	A6	Breast	5	q35.3	q35.3	3	4.3
HT29	A4	Colon	13	q12.3	q13.2	5	9
SW403	A4	Colon	13	q21.1	q21.2	15	6
BT20	A4	Breast	13	q12.3	q13.2	4	9
CPDR9	A4	Prostate	13	q12.2	q12.3	2	7.1
SW480	A5	Colon	7	q22.2	q22.2	9	1
X71	A5	Colon	7	q22.1	q22.2	5	7.2
X72	A5	Colon	7	q22.3	q22.3	6	3.3
Lovo	A6	Colon	7	q22.1	q22.2	5	7.2
X1819_1	A7	Colon	7	q22.1	q22.2	5	7.2
EFM19	A6	Breast	10	q22.1	q22.3	6	15.3
PC3	A6	Prostate	10	q22.2	q22.3	7	8.3
MDA_MB436	A6	Breast	10	q22.1	q22.2	3	10.7
SKBR3	A6	Breast	10	q22.2	q22.3	4	8.3
SW48	A6	Colon	10	q22.1	q22.3	4	15.3
X71	A6	Colon	10	q22.2	q22.3	2	8.3
SKBR3	A7	Breast	7	q11.23	q11.23	5	4
X72	A7	Colon	7	q11.23	q11.23	7	4
X71	A7	Colon	7	q11.23	q11.23	5	4
X1819_1	A7	Colon	7	q11.23	q11.23	4	4
NCI_H69	A7	scLung	7	q11.23	q11.23	4	4
BT20	A8	Breast	1	p12.2	p13.2	10	9
CAMA-1	A8	Breast	1	p12	p12	6	6.7
KPL-1	A8	Breast	1	p11.2	p13.3	11	14.7
Colo205	A9	Colon	6	p21.2	p21.2	8	3.4
MDA_MB231	A9	Breast	6	p21.1	p21.2	7	9.8

NCI_H522	A9	nscLung	6	p21.2	p21.31	6	9.1
PANC-1	A10	Pancreas	18	q23	q23	7	5.2
NCI_H1607	A11	scLung	9	p22.2	p23	10	14.5
NCI_H446	A11	scLung	9	p22.3	p22.3	8	2.9
HCC1954	A11	Breast	9	p22.2	p23	10	14.5

In addition, SEQ ID NO: 1-3049 represents the nucleotide sequences for cDNA sequences corresponding to genes located in these regions of interest. Such regions contain genes found to be amplified and over-expressed in cancerous tissues, especially of breast, colon, lung, cervix, kidney, pancreas and prostate.

Each amplicon may contain about 75 genes, at least one of which will be amplified in a cancerous condition. Genes that show amplification and/or over-expression can be indicative of the cancerous status of a given cell.

Briefly, the procedures used to identify the genes disclosed herein may be summarized as follows:

15

For CGH analysis, based on detailed molecular cytogenetic characterizations, the following data sets are generated, which may include regions reported in the public domain as well as unique regions not previously known.

20

1. A map of chromosomal regions involved in consistent, recurrent and high level genomic gains (i.e., amplifications) for a representative cancer cell line or tumor type (e.g. colon, prostate, breast and lung) that can be recognized as a pattern/signature for a given tumor type.
2. A map of chromosomal regions containing genomic losses (i.e., deletions) in each tumor type and individual cell line to be examined.
3. Levels of intensities of gains and losses categorized for entry into a database.

25

4. A comparison of the patterns of gains and losses between the clinical samples (e.g. colon xenografts) and cell lines (e.g., colon) of matched Stages and Grades.
5. A comparison of the patterns of gains and losses between primary prostate tumor cell lines (e.g., CPDR lines) and metastatic prostate tumor cell lines (e.g., DU 145, PC3 and LNCaP).

In accordance with the present invention, for SKY analysis, data sets were generated according to the following steps:

- 10 1. Identification and development of a database of novel chromosomal rearrangements in epithelial cancer cell lines.
2. Identification of novel translocations involving specific chromosomes or chromosomal regions
- 15 3. Reconciliation of SKY and CGH analysis on the same cell line as a verification of the combined findings.

Combining genomic DNA analysis of gains and losses in the tumor cell lines/clinical samples with cDNA expression analysis from matched tumor types displayed ordered on the assembled Human genome sequence :

20

1. A pattern of gene expression on a Affymetrix chip set (U95 and U133) was used to generate differential gene expression profiles between samples sets containing normal and malignant tissues from colon, prostate, lung, breast and various cell lines.
- 25 2. A Spotfire™ visualization tool was developed that allowed the generation of a list of all the genes that are present in the Human genome sequence within the defined regions of gains/losses for each cell type/tumor type to identify genes to include in the HITS platform and for identification of cancer associated genes

30

3. The following algorithm was employed:

- 5
- i) Match chromosomal regions of amplification/gains defined by CGH with the location of genes/ESTs on an Affymetrix chip as mapped to a Human genome template.
  - ii) Identify genes/ESTs over-expressed in tumor tissue compared to normal tissue in said chromosomal regions using.
  - iii) Compile data on cell lines of a particular tumor type and different tumor types showing clusters of genomic gains and losses at certain chromosomal regions.
  - 10 iv) Pick BACs that span the chromosomal regions consistently gained and containing over-expressed genes in an effort to positionally clone novel cancer genes (oncogenes and genes in relevant pathways)
  - v) Validate the identified genes by
- 15
- A) Picking STS markers that identify the gene sequence and quantify the relative copy number in genomic DNA and RNA across a panel of tumor cell lines.
  - B) Develop probes for FISH on chromosomes from tumor cell lines and primary tumor tissue micro-arrays.

20

4. The expression data from tumor cell lines that have undergone SKY/CGH analysis was used to pick candidate genes to validate as individual targets in functional genomic assays and in-vivo assays and for use in the transcriptional assay platform.

25

In accordance with the present invention, over-expression of cellular genes is conveniently monitored in model cellular systems using cell lines (such as is used in the example below), primary cells, or tissue samples maintained in growth media. For different purposes, these may be treated with

30 compounds at one or more different concentrations to assay for modulating agents. Thus, cellular RNAs are isolated from the cells or cultures as an indicator of selected gene expression. The cellular RNAs are then divided and

subjected to analysis to determine the presence and/or quantity of specific RNA transcripts, which transcripts are then amplified for detection purposes using standard methodologies, such as reverse transcriptase polymerase chain reaction (RT-PCR). The levels of specific RNA transcripts, including  
5 their presence or absence, are determined. When used for identification of modulating agents, such as anti-neoplastic agents, a metric is derived for the type and degree of response of the treated sample compared to control samples.

10 In accordance with the foregoing, the amplicons identified as being amplified and/or over-expressed, which can include increased copy number thereof, in cancerous cells are localized in chromosomal regions of interest as identified in Tables 2 and 3.

15 The genes localized in these amplicons may be utilized to characterize, the cancerous, or non-cancerous, status of cells, or tissues. The methods of the invention may be used with a variety of cell lines or with primary samples from tumors maintained *in vitro* under suitable culture conditions for varying periods of time, or *in situ* in suitable animal models.

20 The amplicons disclosed herein are expressed at levels in cancer cells that are different from the expression levels in non-cancer cells. Expression in cancer versus non-cancer cells of the same tissue type is a key identifier.

25 In accordance with the foregoing, the present invention also relates to a method for identifying a gene modulating agent, such as an anti-neoplastic agent, comprising:

(a) contacting a test compound, a compound whose gene-modulating and/or anti-neoplastic activity is to be determined, with one or more cells  
30 expressing one or more genes mapped to the chromosomal region of interest, or amplicon, for genes as identified in Table 3, and

(b) determining a change in expression of said one or more genes compared to when said contacting has not occurred,

wherein a change in expression of said gene is indicative of gene modulating activity, thereby identifying said test compound as a gene  
5 modulating agent.

In accordance with the foregoing, the present invention relates to a method for identifying an antineoplastic agent, comprising:

(a) contacting a test compound with a cell that expresses one or more  
10 amplicons of Table 2 having an amplification ratio of at least 2.0; and

(b) determining a change in said amplification ratio due to said contacting;

wherein a change in said amplification ratio due to said contacting indicates that said test compound has gene modulating activity

15 thereby identifying said test compound as a gene modulating agent.

The present invention also contemplates a method for identifying an antineoplastic agent, comprising:

(a) contacting a test compound with a cell that expresses at least one  
20 gene corresponding to a polynucleotide comprising a nucleotide sequence of SEQ ID NO: 1 - 3049 and under conditions promoting expression of said gene; and

(b) determining a change in expression of said gene as a result of said contacting

25 wherein a change in expression indicates gene modulation thereby identifying said test compound as a gene modulating agent.

In preferred embodiments of these methods, the change in expression is a decrease in expression and/or the decrease in expression is a decrease  
30 in copy number of the gene and/or the gene comprises a nucleotide sequence of one of SEQ ID NO: 1 – 3049 and/or the cell was genetically engineered to express said gene.

Because the genes disclosed herein are over-expressed and relate to the cancerous condition of a cell, successful anti-neoplastic activity will commonly be exhibited by agents that reduce the expression of said genes. In one embodiment thereof, the change in expression is a decrease in copy number of the gene or genes under study. In accordance therewith, said change in gene copy number is conveniently determined by detecting a change in expression of messenger RNA encoded by said gene sequence. In another preferred embodiment, expression is determined for more than one such gene, such as 2, 5, 10 or more of the genes.

Thus, the present invention also encompasses a method for detecting the cancerous status of a cell, comprising detecting elevated expression in said cell of at least one gene corresponding to a polynucleotide comprising a nucleotide sequence of SEQ ID NO: 1 – 3049 whereby such elevated expression is indicative of cancerous status of the cell. In preferred embodiments thereof, the elevated expression is an elevated copy number of the gene.

Other methods useful in measuring a change in expression of the genes disclosed herein include measuring a change in the amount or rate of synthesis of a polypeptide encoded by said gene, preferably a decrease in synthesis of said polypeptide. Most preferably, the polypeptide comprises an amino acid sequence highly homologous to a sequence encoded by a gene mapping to an amplicon disclosed herein and whose expression is elevated in cancer.

The methods of the invention can thus be utilized to identify anti-neoplastic agents useful in treatment of cancerous conditions. Such activity can be further modified by first identifying such an agent using an assay as already described and further contacting such agent with a cancerous cell, followed by monitoring of the status of said cell, or cells. A change in status

indicative of successful anti-neoplastic activity may include a decrease in the rate of replication of the cancerous cell(s), a decrease in the total number of progeny cells that can be produced by said cancerous cell(s), or a decrease in the number of times said cancerous cell(s) can replicate, or the death of said cancerous cell(s).

Anti-neoplastic agents may also be identified using recombinant cells suitably engineered to contain and express the cancer-related genes disclosed herein. In one such embodiment, a recombinant cell is formed using standard technology and then utilized in the assays disclosed herein. Methods of forming such recombinant cells are well known in the literature. See, for example, Sambrook, et al., *Molecular Cloning: A Laboratory Manual*, Second Edition, Cold Spring Harbor, N.Y., (1989), Wu et al, *Methods in Gene Biotechnology* (CRC Press, New York, NY, 1997), and *Recombinant Gene Expression Protocols*, in *Methods in Molecular Biology*, Vol. 62, (Tuan, ed., Humana Press, Totowa, NJ, 1997), the disclosures of which are hereby incorporated by reference.

The present invention also relates to a method for detecting the cancerous status of a cell, comprising detecting elevated copy number and/or expression in said cell of at least one gene that maps to a chromosomal region of interest, or amplicon, as identified in Table 3. Such elevated expression may be readily monitored by comparison to that of otherwise normal cells having the same genes. Elevated expression of such genes is indicative of the cancerous state. Such elevated expression, including increased copy number, may be the expression of more than one such gene.

The present invention also relates to a method for detecting a cancer-linked gene comprising the steps of contacting a test compound, identified as having gene modulating activity for a gene mapping to one of the amplicons disclosed herein, with a cell expressing a test gene and detecting modulation, such as decreased activity, of such test gene relative to when said compound



is not present thereby identifying said test gene as a cancer-related gene. In preferred embodiments, the gene determined by said method is an oncogene, or cancer facilitating gene.

5. In another embodiment, there is provided a method for treating cancer comprising contacting a cancerous cell with an agent first identified as having gene modulating activity using any of the assay methods disclosed according to the invention and in an amount effective to reduce the cancerous activity of said cell. In a preferred embodiment, the cancerous cell is contacted *in vivo*.
- 10 In other preferred embodiments, said reduction in cancerous activity is a decrease in the rate of proliferation of said cancerous cell, or said reduction in cancerous activity is the death of said cancerous cell.

The present invention further relates to a method for treating cancer comprising contacting a cancerous cell with an agent having activity against an expression product encoded by a gene mapping to an amplicon as disclosed herein, preferably where the expression product is a polypeptide. In a preferred embodiment, said cancerous cell is contacted *in vivo*. In another preferred embodiment, the agent is an antibody.

20

Nucleotide sequences mapping to the amplicons disclosed herein may be genomic in nature and thus represent the sequence of an actual gene, such as a human gene, or may be a cDNA sequence derived from a messenger RNA (mRNA) and thus represent contiguous exonic sequences derived from a corresponding genomic sequence or they may be wholly synthetic in origin for purposes of testing. Such cDNA sequences, mapping to the amplicons disclosed herein are identified as SEQ ID NO: 1-3049.

As described in the Example below, the expression of cancer-related genes may be determined from the relative expression levels of the RNA complement of a cancerous cell relative to a normal (i.e., non-cancerous) cell. Because of the processing that may take place in transforming the initial RNA

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transcript into the final mRNA, the sequences disclosed herein may represent less than the full genomic sequence. They may also represent sequences derived from ribosomal and transfer RNAs. Consequently, the genes present in the cell (and representing the genomic sequences) and the sequences disclosed in SEQ ID NO: 1-3049, which are mostly cDNA sequences, may be identical or may be such that the cDNAs contain less than the full genomic sequence. Such genes and cDNA sequences are still considered corresponding sequences because they both encode similar RNA sequences. Thus, by way of non-limiting example only, a gene that encodes an RNA transcript, which is then processed into a shorter mRNA, is deemed to encode both such RNAs and therefore encodes an RNA complementary to (using the usual Watson-Crick complementarity rules), or that would otherwise be encoded by, a cDNA (for example, a sequence as disclosed herein). Thus, the sequences disclosed herein correspond to genes contained in the cancerous or normal cells used to determine relative levels of expression because they represent the same sequences or are complementary to RNAs encoded by these genes. Such genes also include different alleles and splice variants that may occur in the cells used in the methods of the invention.

In addition, sequences encoding the same proteins as any of these genes, regardless of the percent identity of such sequences, are also specifically contemplated by any of the methods of the present invention that rely on any or all of said sequences, regardless of how they are otherwise described or limited. Thus, any such sequences are available for use in carrying out any of the methods disclosed according to the invention. Such sequences also include any open reading frames, as defined herein, present within any genes mapping to the amplicons of the invention.

The present invention also finds use as a means of diagnosing the presence of cancer in a patient, as where a sample of cancerous tissue or cells, or tissues or cells suspected of being cancerous, are examined for elevated expression, such as at least 2 fold expression, of a gene in one of

the amplicons disclosed herein, such as an increased expression of a cDNA sequence, or polypeptide encoded by said cDNA sequence, disclosed in Table 3 and being one of the sequences of SEQ ID NO: 1 – 3049.

5 For such purposes, and in accordance with the disclosure elsewhere herein, such diagnosis is based on the detection of elevated expression or amplification, such as elevated copy number, of one or more of the genes identified according to the invention. Such elevated expression can be determined by any of the means described herein.

10

In one such embodiment, the elevated expression, as compared to normal cells and/or tissues of the same organ, is determined by measuring the relative rates of transcription of RNA, such as by production of corresponding cDNAs and then analyzing the resulting DNA using probes  
15 developed from genes mapping to the amplicons of the invention. Thus, the levels of cDNA produced by use of reverse transcriptase with the full RNA complement of a cell suspected of being cancerous produces a corresponding amount of cDNA that can then be amplified using polymerase chain reaction, or some other means, such as rolling circle amplification, to determine the  
20 relative levels of resulting cDNA and, thereby, the relative levels of gene expression.

For RNA analysis, the latter may be isolated from samples in a variety of ways, including lysis and denaturation with a phenolic solution containing a  
25 chaotropic agent (e.g., triazol) followed by isopropanol precipitation, ethanol wash, and resuspension in aqueous solution; or lysis and denaturation followed by isolation on solid support, such as a Qiagen resin and reconstitution in aqueous solution; or lysis and denaturation in non-phenolic, aqueous solutions followed by enzymatic conversion of RNA to DNA template  
30 copies. Steady state RNA levels for a given type of cell or tissue may have to be ascertained prior to employment of the methods of the invention but such

is well within the skill of those in the art and will not be further described in detail herein.

Alternatively, increased expression, such as increased copy number, may be determined for the genes present in a cancerous cell, or a cell suspected of being cancerous, by determining elevated expression within the regions of interest, or amplicons, disclosed herein. Thus, the DNA of such cells may be extracted and probed for increased gene expression within the area disclosed herein as amplified in different cancer types and tissues.

10

In employing the methods of the invention, it should be borne in mind that gene expression indicative of a cancerous state need not be characteristic of every cell found to be cancerous. Thus, the methods disclosed herein are useful for detecting the presence of a cancerous condition within a tissue where less than all cells exhibit the complete pattern of over-expression. For example, a set of selected genes, which are found within the regions of interest disclosed herein, may be found, using appropriate probes, either DNA or RNA, to be present in as little as 60% of cells derived from a sample of tumorous, or malignant, tissue while being absent from as much as 60% of cells derived from corresponding non-cancerous, or otherwise normal, tissue (and thus being present in as much as 40% of such normal tissue cells). In a preferred embodiment, such gene pattern is found to be present in at least 70% of cells drawn from a cancerous tissue and absent from at least 70% of a corresponding normal, non-cancerous, tissue sample. In an especially preferred embodiment, such gene pattern is found to be present in at least 80% of cells drawn from a cancerous tissue and absent from at least 80% of a corresponding normal, non-cancerous, tissue sample. In a most preferred embodiment, such gene pattern is found to be present in at least 90% of cells drawn from a cancerous tissue and absent from at least 90% of a corresponding normal, non-cancerous, tissue sample. In an additional embodiment, such gene pattern is found to be present in at least 100% of cells drawn from a cancerous tissue

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and absent from at least 100% of a corresponding normal, non-cancerous, tissue sample, although the latter embodiment may represent a rare occurrence.

5           Because changes in expression of these genes (up-regulation) are linked to the disease state (i.e. cancer), the change in expression may contribute to the initiation or progression of the disease. For example, if a gene that is up-regulated is an oncogene such a gene provides for a means of screening for small molecule therapeutics beyond screens based upon  
10 expression output alone. For example, genes that display up-regulation in cancer and whose elevated expression contributes to initiation or progression of disease represent targets in screens for small molecules that inhibit or block their function. Examples include, but are not be limited to, kinase inhibition, cellular proliferation, substrate analogs that block the active site of  
15 protein targets, etc.

          It should be noted that there are a variety of different contexts in which genes have been evaluated as being involved in the cancerous process. Thus, some genes may be oncogenes and encode proteins that are directly  
20 involved in the cancerous process and thereby promote the occurrence of cancer in an animal. Other genes may simply be involved either directly or indirectly in the cancerous process or condition and may serve in an ancillary capacity with respect to the cancerous state. All such types of genes are deemed with those to be determined in accordance with the invention as  
25 disclosed herein. Thus, the gene determined by said method of the invention may be an oncogene, or the gene determined by said method may be a cancer facilitating gene, the latter including a gene that directly or indirectly affects the cancerous process, either in the promotion of a cancerous condition or in facilitating the progress of cancerous growth or otherwise  
30 modulating the growth of cancer cells, either *in vivo* or *ex vivo*. Such genes may work indirectly where their expression alters the activity of some other gene or gene expression product that is itself directly involved in initiating or

facilitating the progress of a cancerous condition. For example, a gene that encodes a polypeptide, either wild or mutant in type, which polypeptide acts to suppress of tumor suppressor gene, or its expression product, will thereby act indirectly to promote tumor growth.

5

Many cancerous genes appear to have their effect by encoding an aberrant protein that functions in a cell in a manner different from that of normal cells, or else said protein is overproduced or underproduced as a result of some mutation in the coding sequence, or promoter or enhancer sequences, of a particular gene, such as one of Genes 1 – 3049 disclosed  
10 herein and expressed by the amplicons of the invention.

In accordance with the present invention, there are provided methods for measuring the activity, such as a biological activity, of such a polypeptide.  
15 Such biological activity may include any measurable activity, such as chemical reactivity, catalytic ability, binding to specific structures and receptors, acting as a receptor, or just being present in a membrane of a cell and therefore available as a target site for antibodies or other agents. Any such polypeptides may thus provide a target for a chemotherapeutic agent,  
20 especially an antineoplastic agent.

As is well known in the art, polypeptide activities can be measured in different ways so as to enable screening procedures for agents, such as test compounds, that inhibit the activity of the polypeptide and thereby work  
25 against the function of that polypeptide, such as where the polypeptide is some type of cancer-related protein, such as that produced by expression of an oncogene, or where the polypeptide is overproduced as part of the cancer initiating or facilitating process. As non-limiting examples, such screening methods for antineoplastic agents can include the measurement of  
30 compounds that bind to proteins (or that bind to a gene or a transcript of a gene), compounds that inhibit expression (including processing and/or maturation) of a protein, or the detection of downstream reaction product,

most often with specific antibodies using enzyme-linked immunosorbent assay (ELISA) procedures well known in the art, or compounds that inhibit activity, such as enzyme activity or some other function, or compounds that interact with upstream or downstream proteins (such as with transcription factors or other binding proteins that may serve to regulate gene expression).

In accordance with the foregoing, the present invention relates to a method for identifying a compound as an anti-neoplastic agent, comprising:

(a) contacting a test compound with a polypeptide encoded by a gene selected from SEQ ID NO: 1 – 3049,

(b) determining a change in a biological activity of said polypeptide due to said contacting,

wherein a change in activity indicates anti-neoplastic activity and thereby identifies such test compound as an agent having antineoplastic activity.

In a preferred embodiment, the change in biological activity is a decrease in biological activity.

In another preferred embodiment, the biological activity is an enzyme activity, such as where the enzyme is one selected from the group kinase, protease, peptidase, phosphodiesterase, phosphatase, dehydrogenase, reductase, carboxylase, transferase, deacetylase and polymerase.

Assays for these enzymes are available, such as for phosphodiesterases (the most pharmacologically relevant phosphodiesterases are those that hydrolyze cyclic nucleotides (see, for example, cAMP and cGMP assays available from Perkin-Elmer, as well as Estrade et al., Eur. J. Pharmacol. 352:2-3, 157-163 (1998)).

Protein phosphatases remove phosphate residues from proteins. Most tests of their activity use the same assays as for protein kinases. A non-radioactive phosphatase assay system is available from Promega Biotech.

The therapeutically most relevant dehydrogenases oxidize or reduce small molecular weight metabolites, esp. steroid hormones, or that generally use or generate NAD or NADP (see: Haeseleer et al., J. Biol. Chem., 273:21790-21799 (1998)). A commercial assay is available from Cayman  
5 Chemical (at [www.caymanchem.com](http://www.caymanchem.com)).

Gamma-carboxylases are important enzymes in the blood coagulation process. The main assay protocols use synthetic peptides (see: Ulrich et al., J. Biol. Chem., 263:9697-9702 (1988); Begley et al., J. Biol. Chem., 275:36245-36249 (2000)).  
10

In highly preferred embodiments, the kinase is one of a protein kinase, a serine or threonine kinase, or a receptor tyrosine protein kinase. Where the polypeptide encoded by a gene of the invention is a protein kinase, especially involving tyrosine kinase, various assays for activity are available. Protein kinases add phosphate groups to serine, threonine or tyrosine residues on proteins, most commonly measured with phospho-serine, threonine, or tyrosine-specific antibodies, or generation of radiolabeled substrate, or consumption of ATP, or phosphorylation of (synthetic) small peptides, or measuring downstream enzyme activity and gene transcription. Such assays are commercially available. (See, for example, the tyrosine kinase assay from Roche Molecular Biochemicals). Assays for serine/threonine kinases are also  
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25 available at Chromagen.com, Upstate Biotechnology, Inc. (Lake Placid, NY, and at [upstatebiotech.com](http://upstatebiotech.com)) and from Applied BioSystems (Foster City, CA ([home.appliedbiosystems.com](http://home.appliedbiosystems.com))).

In other specific embodiments, the protease is a serine protease, cysteine protease or aspartic acid protease, or the transferase is a methyltransferase, preferably a cytosine methyltransferase or an adenine methyltransferase, or the deacetylase is a histone deacetylase, or the  
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carboxylase is a  $\gamma$ -carboxylase, or the peptidase is a zinc peptidase, or the polymerase is a DNA polymerase or an RNA polymerase.

5 Proteases degrade proteins, un-specifically or at specific sites. Almost all pharmacologically relevant ones have very narrowly defined specific substrates, and their activity is most often measured by directly measuring cleavage product or generation of (fluorescent) light after cleavage of synthetic substrates. Assays are available for serine proteases (Calbiochem, Palo Alto, CA, and see Berdichevsky et al., J. Virol. Methods, 107:245-255  
10 (2003), for cysteine proteases (See: Schulz et al., Mol. Pathol., 51:222-24 (1998) and Selzer et al., PNAS, 96:11015-11022 (1999)), for aspartic acid proteases (Geno Tech, Inc. at [www.genotech.com](http://www.genotech.com)) and for zinc peptidases (see Evans et al., J. Biol. Chem., 278:23180-23186 (2003)).

15 Both (regulatory) DNA-methylases and (biosynthetic) protein methylases that are drug targets. (See: Jonassen and Clarke, J. Biol. Chem., 275:12381-12387 (2000); Jackson et al., Nature, 416:556-560 (2002)).

20 Most HDAC (histone deacetylase) assays use colorimetric or fluorometric (synthetic) substrates. Standard assays are for binding, especially molecular size changes, blocking a specific site, and effects on transcription or downstream reactions (if DNA or RNA is the direct target of a drug). A commercial assay is available from Vinci Biochem (at  
25 [www.vincibiochem.it](http://www.vincibiochem.it)).

In another specific embodiment, the biological activity is a membrane transport activity, preferably wherein the polypeptide is a cation channel protein, an anion channel protein, a gated-ion channel protein or an ABC  
30 transporter protein. Drug effects on the activity of transporter and channel proteins are screened by measuring increase or decrease of the ((radio-)labeled) transported entity inside or outside the cell, in cell-based assays, ATP consumption (in the case of ATPases), or changes in cell membrane



potential. Assays employing such proteins are available, such as for ABC transporter (see: Marcil et al., *Lancet*, 354:1341-46 (1999) and for ion channels (from Evotec OAI, at [www.evotecoi.com](http://www.evotecoi.com) and from PharmaLinks, at [www.pharmalinks.org/research/cellsignalling](http://www.pharmalinks.org/research/cellsignalling)).

5

In one embodiment, the polypeptide is an integrin (the signal transduction pathways elicited by the integrins are slow and not very well characterized, hence most assays are either just binding assays or measure downstream biological phenomena (such as migration, invasion, etc.) (See: Ganta et al., *Endocrinology*, 138:3606-3612 (1997); Sim et al., *J. Biomed. Mater. Research*, 68A:352-359 (2004); and Weinreb et al., *Anal. Biochem.*, 306:305-313 (2002)), or a Cytochrome P450 enzyme (almost all cytochrome assays require knowledge of what the substrate is and measure conversion of substrate (free or (radio-)labeled) or generation of product; useful C<sup>14</sup>-labeled substrates are available from Amersham Biosciences at [www1.amershambiosciences.com](http://www1.amershambiosciences.com)), or a nuclear hormone receptor (Assays available from Discoverx, Fremont, CA, such as an estrogen assay; also see Rosen et al., *Curr. Opin. Drug. Discov. Devel.*, 6:224-30 (2003)).

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In one preferred embodiment, the biological activity is a receptor activity, preferably where the receptor is a G-protein-coupled receptor (GPCR).

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GPCRs are transmembrane proteins that wind 7 times back and forth through a cell's plasma membrane with a ligand binding site located on the outside of the membrane surface of the cell and the effector site being present inside the cell. These receptors bind GDP and GTP. In response to ligand binding, GPCRs activate signal transduction pathways which induce a number of assayable physiological changes, e.g., an increase in intracellular calcium levels, cyclic-AMP, inositol phosphate turnover, and downstream gene transcription (directly or via reporter-assays) along with other translocation assays available for measuring GPCR activation when the polypeptide

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encoded by a gene of the invention is a GPCR. Thus, such proteins work through a second messenger. The result is activation of CREB, a transcription factor that stimulates the production of gene products. One useful assay is the so-called BRET2/arrestin assay, useful in screening for compounds that interact with GPCRs. (See: Bertrand et al, J. Recept. Signal Transduct Res., 22:533-41 (Feb.-Nov. 2002)). In addition, numerous assays are commercially available, such as the Transfluor Assay, available from Norak Biosciences, Inc. (www.norakbio.com) or ArrayScan and KineticScan, both from Cellomics, or assays from CyBio (Jena, Germany).

Assays useful with the invention are usually set up to screen for agonists or antagonists after adding ligand, but effects on most of these parameters can be measured whether or not the ligand for the receptor is known. Such assays may involve radioligand-binding assays. Activation of the majority of GPCRs by agonists leads to the interaction of beta-arrestin (a protein that is involved in receptor desensitization and sequestration) with the receptor, which is measurable by fluorescence energy transfer

The disclosure of all journal articles, or other publications, referred to herein are hereby incorporated by reference in their entirety.

In one embodiment, the polypeptide is in a solution or suspension and contact with the test compound is by direct contact between the test compound and the protein molecule. Alternatively, the polypeptide may be in a cell and the test compound may have to diffuse into the cell in order to contact the polypeptide. In an alternative embodiment, the test compound may be contacted with a cell that contains or expresses the polypeptide but the test compound may have no direct contact with the polypeptide. In stead, the test compound may act to induce production and/or activity of a different compound, such as an intracellular second messenger that serves to contact the polypeptide and modulate or change the biological activity of this polypeptide.

In accordance with the foregoing, the method of the present invention includes cancer modulating agents that are themselves either polypeptides, or small chemical entities, that affect the cancerous process, including initiation, suppression or facilitation of tumor growth, either *in vivo* or *ex vivo*. Such agents may also be antibodies that react with one or more polypeptides encoded by genes present in the amplicons of the invention.

In keeping with the disclosure herein, the present invention also relates to a method for treating cancer comprising contacting a cancerous cell with an agent having activity against an expression product encoded by a gene mapping within regions of chromosomal interest.

The method of the present invention includes embodiments of the above-recited method wherein said cancer cell is contacted *in vivo* as well as *ex vivo*, preferably wherein said agent comprises a portion, or is part of an overall molecular structure, having affinity for said expression product. In one such embodiment, said portion having affinity for said expression product is an antibody.

20

In one embodiment of the present invention, a chemical agent, such as a protein or other polypeptide, is joined to an agent, such as an antibody, having affinity for an expression product of a cancerous cell, such as a polypeptide or protein encoded by a gene related to the cancerous process, especially a gene mapping to an amplicon as disclosed herein. In a specific embodiment, said expression product acts as a therapeutic target for the affinity portion of said anticancer agent and where, after binding of the affinity portion of such agent to the expression product, the anti-cancer portion of said agent acts against said expression product so as to neutralize its effects in initiating, facilitating or promoting tumor formation and/or growth. In a separate embodiment of the present invention, binding of the agent to said expression product may, without more, have the effect of deterring cancer

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promotion, facilitation or growth, especially where the presence of said expression product is related, either intimately or only in an ancillary manner, to the development and growth of a tumor. Thus, where the presence of said expression product is essential to tumor initiation and/or growth, binding of  
5 said agent to said expression product will have the effect of negating said tumor promoting activity. In one such embodiment, said agent is an apoptosis-inducing agent that induces cell suicide, thereby killing the cancer cell and halting tumor growth.

10 Many cancers contain chromosomal rearrangements, which typically represent translocations, amplifications, or deletions of specific regions of genomic DNA. A recurrent chromosomal rearrangement that is associated with a specific stage and type of cancer always affects a gene (or possibly  
15 genes) that play a direct and critical role in the initiation or progression of the disease. Many of the known oncogenes or tumor suppressor genes that play direct roles in cancer have either been initially identified based upon their positional cloning from a recurrent chromosomal rearrangement or have been demonstrated to fall within a rearrangement subsequent to their cloning by  
20 other methods. In all cases, such genes display amplification at both the level of DNA copy number and at the level of transcriptional expression at the mRNA level.

In accordance with the present invention, said functionally related genes are genes modulating the same metabolic pathway or said genes are  
25 genes encoding functionally related polypeptides. In one such embodiment, said genes are genes whose expression is modulated by the same transcriptional activator or enhancer sequence, especially where said transcriptional activator or enhancer increases, or otherwise modulates, the activity of a gene mapping to one of the amplicons of the invention.

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The present invention also relates to a process that comprises a method for producing a product, such as test data, comprising identifying an

agent according to one of the disclosed methods for identifying such an agent (i.e., the therapeutic agents identified according to the assay procedures disclosed herein) wherein said product is the data collected with respect to said agent as a result of said identification process, or assay, and wherein  
5 said data is sufficient to convey the chemical character and/or structure and/or properties of said agent. For example, the present invention specifically contemplates a situation whereby a user of an assay of the invention may use the assay to screen for compounds having the desired enzyme modulating activity and, having identified the compound, then conveys that information  
10 (i.e., information as to structure, dosage, etc) to another user who then utilizes the information to reproduce the agent and administer it for therapeutic or research purposes according to the invention. For example, the user of the assay (user 1) may screen a number of test compounds without knowing the structure or identity of the compounds (such as where a number of code  
15 numbers are used the first user is simply given samples labeled with said code numbers) and, after performing the screening process, using one or more assay processes of the present invention, then imparts to a second user (user 2), verbally or in writing or some equivalent fashion, sufficient information to identify the compounds having a particular modulating activity  
20 (for example, the code number with the corresponding results). This transmission of information from user 1 to user 2 is specifically contemplated by the present invention.

In accordance with the foregoing, the present invention relates to a  
25 method for producing test data with respect to the anti-neoplastic activity of a compound, such as a test compound as defined herein, comprising:

- (a) identifying a test compound as having anti-neoplastic activity using a method of the invention, such as measuring the biological activity of a polypeptide encoded by a gene of Table 3 (SEQ ID NO: 1-3049), and  
30
- (b) producing test data with respect to the anti-neoplastic activity of said test compound sufficient to identify the chemical structure of said test compound.

In another embodiment, the present invention provides a method for monitoring the progress of a cancer treatment, such as where the methods of the invention permit a determination that a given course of cancer therapy is or is not proving effective because of an increased or decreased expression of a gene, or genes, mapping to an amplicon as disclosed herein. For example, where there is an increased copy number of one or more of said genes monitoring of such genes can predict success or failure of a course of therapy, such as chemotherapy, or predict the likelihood of a relapse based on elevated activity or expression of one or more of these genes following such course of therapy.

In accordance with the foregoing, the present invention contemplates a method for determining the progress of a treatment for cancer in a patient afflicted with cancer, following commencement of a cancer treatment on said patient, comprising determining in said patient a change in expression of one or more genes, preferably more than one, corresponding to a gene of Table 3 or encoding a polypeptide or transcript of such a gene, or genes compared to expression of said one or more determined genes prior to commencement of said cancer treatment, wherein a change in expression, especially a decrease in expression, indicates positive effects of such treatment, thereby determining the progress of said treatment.

In a preferred embodiment, the detected change in expression is a decrease in expression. In another preferred embodiment, the cancer treatment is treatment with a chemotherapeutic agent, especially an agent that modulates, preferably decreases, expression of a gene identified herein, such as where said agent was first identified as having anti-neoplastic activity using a method of the invention. Thus, in accordance with this aspect of the present invention, a patient, or even a research animal, such as a mouse, rat, rabbit or primate, afflicted with cancer, including a cancer induced for research purposes, is introduced to a cancer treatment regimen, such as

administration of an anti-cancer agent, including one first identified as having anti-neoplastic activity by one or more of the screening methods disclosed herein. The progress and success or failure of such treatment is subsequently ascertained by determining the subsequent expression of one or more, preferably at least 3, or 5, or 10, of genes mapping to one or more of the amplicons disclosed herein, preferably to the same amplicon, or that encodes a transcript or polypeptide of such a gene following said treatment. In a preferred embodiment, a treatment that reduces said expression is deemed advantageous and may then be the basis for continuing said treatment. The methods of the invention thereby provide a means of continually monitoring the success of the treatment and evaluating both the need, and desirability, of continuing said treatment. In addition, more than one said treatment may be administered simultaneously without diminishing the value of the methods of the invention in determining the overall success of such combined treatment. Thus, more than one said anti-neoplastic agent may be administered to the same patient and overall effectiveness ascertained by the recited methods.

In accordance with the foregoing, the present invention also contemplates a method for determining the likelihood of survival of a patient afflicted with cancer, following commencement of a cancer treatment on said patient, comprising determining in said patient a change in expression of one or more genes, preferably more than one, corresponding to a gene of Table 3 or encoding a polypeptide or transcript of such a gene, or genes, compared to expression of said one or more determined genes prior to commencement of said cancer treatment, wherein a change in expression, especially a decrease in expression, indicates positive and life-extending effects of such treatment, thereby determining the likelihood of survival of said treatment.

In a preferred embodiment, the detected change in expression is a decrease in expression and said determined gene, or genes, may include 2, 3, 5, 10 or more of the genes described herein. Thus, the methods of the invention may be utilized as a means for compiling cancer survival statistics



following one or more, possibly combined, treatments for cancer as in keeping with the other methods disclosed herein.

5 The genes of the amplicons, or regions of interest, identified herein also offer themselves as pharmacodynamic markers (or as pharmacogenetic and/or surrogate markers), such as for patient profiling prior to clinical trials and/or targeted therapies, including combination treatments, resulting from the identification of these genes as valid gene targets for chemotherapy based on the screening procedures of the invention. In one embodiment  
10 thereof, the likelihood of success of a cancer treatment with a selected chemotherapeutic agent may be based on the fact that such agent has been determined to have expression modulating activity with one or more genes identified herein, especially where said genes have been identified as showing elevated expression levels in samples from a prospective patient  
15 afflicted with cancer. Methods described elsewhere herein for determining cancerous status of a cell may find ready use in such evaluations.

It should be cautioned that, in carrying out the procedures of the present invention as disclosed herein, any reference to particular buffers,  
20 media, reagents, cells, culture conditions and the like are not intended to be limiting, but are to be read so as to include all related materials that one of ordinary skill in the art would recognize as being of interest or value in the particular context in which that discussion is presented. For example, it is often possible to substitute one buffer system or culture medium for another  
25 and still achieve similar, if not identical, results. Those of skill in the art will have sufficient knowledge of such systems and methodologies so as to be able, without undue experimentation, to make such substitutions as will optimally serve their purposes in using the methods and procedures disclosed herein.

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The present invention will now be further described by way of the following non-limiting example. In applying the disclosure of the example, it

should be kept clearly in mind that other and different embodiments of the methods disclosed according to the present invention will no doubt suggest themselves to those of skill in the relevant art.

5

### EXAMPLE

Cancerous cells that over-express one or more genes mapping to the amplicons disclosed herein, are grown to a density of  $10^5$  cells/cm<sup>2</sup> in Leibovitz's L-15 medium supplemented with 2 mM L-glutamine (90%) and 10% fetal bovine serum. The cells are collected after treatment with 0.25% trypsin, 0.02% EDTA at 37°C for 2 to 5 minutes. The trypsinized cells are then diluted with 30 ml growth medium and plated at a density of 50,000 cells per well in a 96 well plate (200 µl/well). The following day, cells are treated with either compound buffer alone, or compound buffer containing a chemical agent to be tested, for 24 hours. The media is then removed, the cells lysed and the RNA recovered using the RNeasy reagents and protocol obtained from Qiagen. RNA is quantitated and 10 ng of sample in 1 µl are added to 24 µl of Taqman reaction mix containing 1X PCR buffer, RNAsin, reverse transcriptase, nucleoside triphosphates, amplitaq gold, tween 20, glycerol, bovine serum albumin (BSA) and specific PCR primers and probes for a reference gene (18S RNA) and a test gene (Gene X). Reverse transcription is then carried out at 48°C for 30 minutes. The sample is then applied to a Perlin Elmer 7700 sequence detector and heat denatured for 10 minutes at 95°C. Amplification is performed through 40 cycles using 15 seconds annealing at 60°C followed by a 60 second extension at 72°C and 30 second denaturation at 95°C. Data files are then captured and the data analyzed with the appropriate baseline windows and thresholds.

The quantitative difference between the target and reference genes is then calculated and a relative expression value determined for all of the samples used. This procedure is then repeated for each of the target genes in

a given signature, or characteristic, set and the relative expression ratios for each pair of genes is determined (i.e., a ratio of expression is determined for each target gene versus each of the other genes for which expression is measured, where each gene's absolute expression is determined relative to the reference gene for each compound, or chemical agent, to be screened).

5 The samples are then scored and ranked according to the degree of alteration of the expression profile in the treated samples relative to the control. The overall expression of the set of genes relative to the controls, as modulated by one chemical agent relative to another, is also ascertained. Chemical agents

10 having the most effect on a given gene, or set of genes, are considered the most anti-neoplastic.

#### SEQUENCE LISTING ON CD-ROM ONLY

15

The sequences disclosed herein as SEQ ID NO: 1-3049 in the sequence listing are contained on compact disc (CD-ROM) only (denoted as Filename: Avalon 237 (5,279 kB), 4 copies of which appear on discs denoted Copy 1, Copy 2, Copy 3 and CRF, and which discs were generated on 7

20 March 2005), which accompanies this application and the contents of said CD-ROMs are hereby incorporated by reference in their entirety. These sequence numbers correspond to cDNA sequences derived from the genes identified in Table 3 .

Table 3 – Amplicon Identification

Amplicon	Transcript Id	Name	Chromosome	bpstart	bpend
A1	ENST00000303924	HAS2	8	122582937	122598168
A1	ENSESTT00000046662	t	8	122585931	122609941
A1	ENSESTT00000046660		8	122608522	122610061
A1	ENSESTT00000046661		8	122640599	122653390
A1	ENST00000328524		8	123738119	123738958
A1	ENSESTT00000047108		8	123750171	123920219
A1	ENST00000314393	NM_014943	8	123750577	123943336
A1	ENSESTT00000047109		8	123789727	123790358
A1	ENSESTT00000047110		8	123921884	123943336
A1	ENSESTT00000047116		8	123983935	123988137
A1	ENSESTT00000047111		8	123983935	124011208
A1	ENSESTT00000047112		8	123983935	124011208
A1	ENST00000259512	NM_024295	8	123984034	124011088
A1	ENSESTT00000047115		8	123984041	123990329
A1	ENSESTT00000047114		8	123987689	123999547
A1	ENSESTT00000047113		8	123991511	124011208
A1	ENSESTT00000065616		8	124041564	124062478
A1	ENST00000287380	NM_145647	8	124041598	124120767
A1	ENSESTT00000065617		8	124042077	124066211
A1	ENST00000309336	Q8TAK7	8	124046061	124098030
A1	ENST00000327098	Q8TAK7	8	124062489	124073028
A1	ENSESTT00000065618		8	124074181	124088995
A1	ENSESTT00000065619		8	124094878	124098018
A1	ENSESTT00000065620		8	124099026	124120981
A1	ENSESTT00000065621		8	124109587	124120981
A1	ENSESTT00000065622		8	124109691	124120981

TABLE 3 (Continued)

A1	ENST000000318462	Q86UY5	8	124147875	124177793
A1	ENSESTT00000065624		8	124151533	124162903
A1	ENSESTT00000065623		8	124151533	124177809
A1	ENST000000276699	NM_032899	8	124151685	124176255
A1	ENSESTT00000065671		8	124188795	124210200
A1	ENST000000276704	NM_032847	8	124188931	124210174
A1	ENSESTT00000065672		8	124189023	124210138
A1	ENSESTT00000065673		8	124195324	124210138
A1	ENSESTT00000065668		8	124218685	124236123
A1	ENST000000297857	ZHX1	8	124222153	124224774
A1	ENSESTT00000065670		8	124224524	124243082
A1	ENSESTT00000065669		8	124224572	124243107
A1	ENST000000309019		8	124284858	124285232
A1	ENST000000287394	NM_014109	8	124289962	124365185
A1	ENSESTT00000065666		8	124294833	124315051
A1	ENSESTT00000065667		8	124305201	124313890
A1	ENSESTT00000065665		8	124315497	124328452
A1	ENST000000329771		8	124369449	124370499
A1	NST000000287387	M_018024	8	124385553	124410848
A1	NSESTT00000065625		8	124385553	124410849
A1	ENSESTT00000065626		8	124385601	124410849
A1	ENSESTT00000065627		8	124385602	124410849
A1	ENSESTT00000065628		8	124385602	124410849
A1	ENST000000287396	FBX032	8	124471947	124510034
A1	ENSESTT00000065664		8	124472004	124500973
A1	ENSESTT00000065662		8	124472004	124510034
A1	ENSESTT00000065663		8	124483080	124510034
A1	ENST000000325995		8	124614600	124621754
A1	ENST000000330051		8	124614651	124621727
A1	ENST000000329589		8	124614654	124621727

TABLE 3 (Continued)

A1	ENSESTT00000065661		8	124649681	124657768
A1	ENST00000262219	ANXA13	8	124650068	124681581
A1	ENSESTT00000065659		8	124662584	124706220
A1	ENSESTT00000065660		8	124667216	124706214
A1	ENST00000334705	Q8N6F3	8	124737531	124744075
A1	ENST00000325963	NM_144963	8	124747485	124784276
A1	ENSESTT00000065657		8	124749308	124767066
A1	ENSESTT00000065656		8	124753384	124767066
A1	ENSESTT00000065658		8	124777101	124779458
A1	ENST00000297628		8	124934987	124955009
A1	ENST00000321393	NM_173684	8	124982464	124984850
A1	ENSESTT00000049471		8	125004837	125009297
A1	ENST00000308614	NM_182525	8	125014902	125029621
A1	ENST00000330102		8	125045027	125088508
A1	ENST00000327482		8	125120753	125121402
A1	ENST00000297632	Q8WVK5	8	125280819	125341514
A1	ENSESTT00000049470		8	125282330	125296251
A1	ENST00000328599	NM_017956	8	125419757	125421103
A1	ENSESTT00000049469		8	125441637	125443183
A1	ENSESTT00000049445		8	125443596	125455222
A1	ENST00000303545	RNF139	8	125443702	125456727
A1	ENSESTT00000049468		8	125454689	125456214
A1	ENSESTT00000049466		8	125457337	125491832
A1	ENSESTT00000049464		8	125457337	125507878
A1	ENSESTT00000049463		8	125457337	125507907
A1	ENSESTT00000049461		8	125457337	125507908
A1	ENSESTT00000049458		8	125457337	125507913
A1	ENSESTT00000049467		8	125457339	125472731
A1	ENSESTT00000049462		8	125457339	125507908
A1	ENST00000276692	NM_032026	8	125457339	125507917

TABLE 3 (Continued)

A1	ENSESTT000000049465			8	125472748	125507878
A1	ENSESTT000000049459			8	125472748	125507913
A1	ENSESTT000000049460			8	125473099	125507913
A1	ENST00000276689	NDUFB9		8	125507932	125518808
A1	ENSESTT000000049446			8	125507947	125518807
A1	ENST00000325064	MTSS1		8	125519619	125697247
A1	ENSESTT000000049457			8	125521907	125524630
A1	ENSESTT000000049456			8	125525191	125526708
A1	ENSESTT000000049455			8	125526532	125537360
A1	ENSESTT000000049453			8	125553967	125697188
A1	ENSESTT000000049454			8	125668151	125697188
A1	ENST00000319286	NM_152412		8	125942128	125948216
A1	ENSESTT000000049452			8	125965815	125967028
A1	ENST00000265896	SOLE		8	125968234	125990776
A1	ENSESTT000000049447			8	125974452	125989666
A1	ENSESTT000000049451			8	125987460	125991054
A1	ENSESTT000000049448			8	125993091	125997546
A1	ENSESTT000000049450			8	125993091	126001545
A1	ENSESTT000000049449			8	125993091	126006166
A1	ENST00000318410	Y196_HUMAN		8	125993448	126052729
A1	ENSESTT000000052951			8	126001094	126012931
A1	ENSESTT000000052952			8	126001094	126012931
A1	ENSESTT000000052949			8	126001094	126013531
A1	ENSESTT000000052944			8	126001094	126032404
A1	ENSESTT000000052945			8	126001094	126032404
A1	ENSESTT000000052953			8	126001148	126008731
A1	ENSESTT000000052950			8	126006063	126013531
A1	ENSESTT000000052946			8	126006063	126032404
A1	ENSESTT000000052948			8	126012674	126016164
A1	ENSESTT000000052947			8	126013317	126032404

TABLE 3 (Continued)

A1	ENSESTT000000052943		8	126036476	126043900
A1	ENSESTT000000052941		8	126045186	126060614
A1	ENSESTT000000052942		8	126051717	126060573
A1	ENST000000287437	NM_173685	8	126060684	126335950
A1	ENSESTT000000052921		8	126060694	126120112
A1	ENSESTT000000052935		8	126060694	126151406
A1	ENSESTT000000052934		8	126060694	126326148
A1	ENSESTT000000052931		8	126060694	126326652
A1	ENSESTT000000052932		8	126060694	126326652
A1	ENSESTT000000052933		8	126060694	126335951
A1	ENSESTT000000052929		8	126060694	126335951
A1	ENSESTT000000052930		8	126060717	126151406
A1	ENSESTT000000052924		8	126060717	126326652
A1	ENSESTT000000052923		8	126060717	126335951
A1	ENSESTT000000052922		8	126060741	126151406
A1	ENSESTT000000052926		8	126060741	126326652
A1	ENSESTT000000052925		8	126150930	126335951
A1	ENSESTT000000052927		8	126317027	126320247
A1	ENSESTT000000052940		8	126326536	126335951
A1	ENSESTT000000052928	NM_025195	8	126399453	126407235
A1	ENST000000311922		8	126399454	126404869
A1	ENSESTT000000052936		8	126400000	126402312
A1	ENSESTT000000052939		8	126402477	126405286
A1	ENSESTT000000052937		8	126552574	126553590
A1	ENST000000311709	Q9P1E1	8	126914570	126919779
A1	ENSESTT000000052938		8	127041420	127043050
A1	ENST000000329599		8	127466983	127469137
A1	ENSESTT000000046663		8	127487532	127491189
A1	ENSESTT000000046664		8	96395910	96638676
A2	ENSESTT000000040368		13		



TABLE 3 (Continued)

A2	ENSESTT00000040357				
A2	OTTHUMT00013002849	FARP1-006	13	96493435	96594999
A2	ENSESTT00000040356		13	96493435	96595559
A2	OTTHUMT00013002844	FARP1-001	13	96493435	96762294
A2	ENST000000319562	FARP1	13	96493435	96800024
A2	ENSESTT00000040369		13	96493506	96798828
A2	OTTHUMT00013002835	bA10G5.1-002	13	96526040	96526774
A2	OTTHUMT00013002834	bA10G5.1-001	13	96526040	96527520
A2	ENST000000267291	ZNF183L1	13	96526425	96527547
A2	OTTHUMT00013002839	bA261P24.2-002	13	96526535	96527491
A2	OTTHUMT00013002838	bA261P24.2-001	13	96678973	96683493
A2	ENSESTT00000040358		13	96679135	96683493
A2	OTTHUMT00013002845	FARP1-002	13	96715645	96762294
A2	OTTHUMT00013002846	FARP1-003	13	96734616	96736041
A2	OTTHUMT00013002847	FARP1-004	13	96754326	96762232
A2	OTTHUMT00013002848	FARP1-005	13	96759593	96775753
A2	OTTHUMT00013002842	bA11L24.3-001	13	96781485	96786357
A2	ENSESTT00000040359		13	96785660	96786095
A2	OTTHUMT00013002862	STK24-005	13	96789051	96798697
A2	OTTHUMT00013002859	STK24-002	13	96800456	96816816
A2	OTTHUMT00013002858	STK24-001	13	96800456	96872252
A2	ENSESTT00000040367		13	96800456	96927118
A2	ENSESTT00000040366		13	96802878	96810698
A2	ENSESTT00000040365		13	96802878	96816333
A2	ENSESTT00000040363		13	96802878	96825181
A2	ENSESTT00000040360		13	96802878	96825239
A2	ENSESTT00000040361		13	96802878	96927359
A2	ENST000000261573	STK24	13	96802878	96927359
A2	OTTHUMT00013002863	STK24-006	13	96803428	96872107
A2	OTTHUMT00013002860	STK24-003	13	96805676	96814040
			13	96806237	96869522

A2	ENSESTT000000040364			13	96812027	96825239
A2	OTTHUMT00013002861	STK24-004		13	96825116	96928195
A2	OTTHUMT00013002864	STK24-007		13	96855283	96926459
A2	ENSESTT000000040362			13	96855283	96926459
A2	ENST00000313290	Q8WYY0		13	96886851	96887246
A2	OTTHUMT00013002856	bA295B17.5-001		13	96927499	96929085
A2	OTTHUMT00013002872	bA295B17.2-001		13	96960547	96961131
A2	OTTHUMT00013002874	bA295B17.3-001		13	96979939	96980244
A2	OTTHUMT00013002876	bA295B17.4-001		13	96991069	96991494
A2	OTTHUMT00013002878	SLC15A1-001		13	97034056	97102908
A2	ENST00000218552	SLC15A1		13	97034979	97076822
A2	OTTHUMT00013002879	SLC15A1-002		13	97070782	97076822
A2	ENST00000313260	O14496		13	97071712	97076756
A2	OTTHUMT00013002899	bA155N3.2-010		13	97143742	97182048
A2	OTTHUMT00013002890	bA155N3.2-001		13	97143742	97328245
A2	ENSESTT000000040495			13	97144240	97147514
A2	ENSESTT000000040494			13	97144240	97150734
A2	ENST00000301980	DOC9_HUMAN		13	97147367	97436606
A2	OTTHUMT00013002902	bA155N3.2-013		13	97150543	97179710
A2	OTTHUMT00013002901	bA155N3.2-012		13	97157916	97179621
A2	OTTHUMT00013002898	bA155N3.2-009		13	97159564	97197939
A2	ENSESTT000000040492			13	97160444	97203725
A2	ENSESTT000000040493			13	97160510	97182047
A2	OTTHUMT00013002900	bA155N3.2-011		13	97160514	97179751
A2	OTTHUMT00013002896	bA155N3.2-007		13	97181651	97206239
A2	OTTHUMT00013002895	bA155N3.2-006		13	97182029	97200335
A2	OTTHUMT00013002882	bA155N3.3-001		13	97182339	97184884
A2	OTTHUMT00013002894	bA155N3.2-005		13	97196203	97210731
A2	ENSESTT000000040491			13	97206155	97213319
A2	OTTHUMT00013002897	bA155N3.2-008		13	97210436	97213803

TABLE 3 (Continued)

A2	ENSESTT00000040490	13	97210439	97213399
A2	ENSESTT00000040489	13	97217686	97230930
A2	ENSESTT00000040488	13	97234078	97238454
A2	OTTHUMT00013002893	13	97238390	97238940
A2	ENSESTT00000040487	13	97253255	97271344
A2	ENSESTT00000040486	13	97253255	97276111
A2	OTTHUMT00013002891	13	97272306	97436880
A2	ENST000000333692	13	97300012	97300702
A2	OTTHUMT00013002884	13	97300012	97300702
A2	OTTHUMT00013002892	13	97305690	97436648
A2	ENSESTT00000040485	13	97305748	97436584
A2	OTTHUMT00013002888	13	97523848	97524745
A2	OTTHUMT00013002886	13	97540834	97541246
A2	ENST000000325317	13	97541028	97541237
A2	OTTHUMT00013002916	13	97546697	97550965
A2	OTTHUMT00013002917	13	97546697	97550965
A2	ENSESTT00000040484	13	97547656	97550936
A2	OTTHUMT00013002939	13	97551029	97735570
A2	OTTHUMT00013002933	13	97551029	97735795
A2	ENSESTT00000040442	13	97551031	97736683
A2	ENSESTT00000040438	13	97551081	97718301
A2	ENSESTT00000040437	13	97551081	97736683
A2	ENSESTT00000040439	13	97551109	97664477
A2	OTTHUMT00013002940	13	97551142	97690820
A2	OTTHUMT00013002942	13	97551147	97664475
A2	ENSESTT00000040440	13	97551164	97718142
A2	OTTHUMT00013002932	13	97551164	97736689
A2	OTTHUMT00013002941	13	97551171	97594879
A2	ENSESTT00000040441	13	97551172	97736683
A2	ENST000000257320	13	97551667	97735590
	PHGDHL1			

TABLE 3 (Continued)

A2	OTTHUMT00013002920	bA461N23.2-001	13	97565231	97566117
A2	ENST00000325202		13	97565627	97566013
A2	ENST00000325028	PHGDHL1	13	97588684	97735590
A2	OTTHUMT00013002934	bA178C10.1-003	13	97594770	97736689
A2	OTTHUMT00013002928	GPR18-001	13	97604987	97611999
A2	ENST00000245300	GPR18	13	97604995	97608642
A2	ENSESTT00000040482		13	97605550	97608614
A2	OTTHUMT00013002929	GPR18-002	13	97605834	97608629
A2	ENSESTT00000040483		13	97606624	97608610
A2	OTTHUMT00013002922	EBI2-001	13	97644794	97657708
A2	ENST00000301931	EBI2	13	97644799	97657654
A2	ENSESTT00000040481		13	97645785	97657708
A2	OTTHUMT00013002937	bA178C10.1-006	13	97658207	97735649
A2	OTTHUMT00013002935	bA178C10.1-004	13	97663038	97736689
A2	OTTHUMT00013002936	bA178C10.1-005	13	97664963	97735953
A2	OTTHUMT00013002924	bA461N23.5-001	13	97668409	97669210
A2	OTTHUMT00013002926	bA461N23.6-001	13	97701675	97702282
A2	OTTHUMT00013002938	bA178C10.1-007	13	97718042	97727821
A2	OTTHUMT00013002954	bA178C10.2-001	13	97722428	97722941
A2	ENSESTT00000040480		13	97736300	97736679
A2	ENSESTT00000040479		13	97756206	97759085
A2	OTTHUMT00013002956	bA178C10.3-001	13	97758036	97759317
A2	OTTHUMT00013002960	bA214F16.3-001	13	97841538	97842752
A2	OTTHUMT00013002958	bA214F16.2-001	13	97849982	97851307
A2	ENSESTT00000040461		13	97851670	97897704
A2	ENSESTT00000040460		13	97851670	97905912
A2	ENSESTT00000040457		13	97851670	97913646
A2	ENSESTT00000040458		13	97851670	97913646
A2	ENSESTT00000040459		13	97851670	97913646
A2	ENSESTT00000040462		13	97851727	97867945

TABLE 3 (Continued)

A2	OTTHUMT00013002963	TM9SF2-002	13	97851729	97897328
A2	OTTHUMT00013002962	TM9SF2-001	13	97851729	97913644
A2	ENST00000245361	TM9SF2	13	97851862	97913013
A2	OTTHUMT00013002964	TM9SF2-003	13	97864470	97888117
A2	ENSESTT00000040467		13	97886862	97897704
A2	ENSESTT00000040466		13	97886862	97905912
A2	ENSESTT00000040463		13	97886862	97913646
A2	ENSESTT00000040464		13	97886862	97913646
A2	ENSESTT00000040465		13	97886862	97913646
A2	ENSESTT00000040468		13	97890373	97891991
A2	OTTHUMT00013002965	TM9SF2-004	13	97890766	97891991
A2	ENSESTT00000040471		13	97891812	97905912
A2	ENSESTT00000040469		13	97891812	97913646
A2	ENSESTT00000040470		13	97891812	97913646
A2	ENSESTT00000040473		13	97897238	97905912
A2	ENSESTT00000040472		13	97897238	97909646
A2	ENSESTT00000040474		13	97899412	97905912
A2	ENSESTT00000040476		13	97912182	97912840
A2	OTTHUMT00013002970	bA214F16.4-001	13	97927367	97930623
A2	OTTHUMT00013002972	bA214F16.5-001	13	97932961	97933435
A2	ENSESTT00000040478		13	97956924	98215198
A2	ENSESTT00000040477		13	97956924	98221218
A2	OTTHUMT00013002980	CLYBL-001	13	97956924	98242825
A2	ENST00000323941	CLYBL	13	97956937	98242824
A2	OTTHUMT00013002981	CLYBL-002	13	97956945	98241868
A2	OTTHUMT00013002982	CLYBL-003	13	97956951	98242819
A2	OTTHUMT00013002974	bA279D17.1-001	13	98040336	98041226
A2	OTTHUMT00013002976	bA279D17.2-001	13	98076502	98077746
A2	ENSESTT00000040339		13	98076717	98079197
A2	ENSESTT00000040309		13	98123162	98215493

TABLE 3 (Continued)

A2	OTTHUMT00013002978	bA134O15.2-001	13	98124280	98125544
A2	OTTHUMT00013002983	CLYBL-004	13	98209116	98215493
A2	OTTHUMT00013002984	CLYBL-005	13	98209116	98215493
A2	ENSESTT00000040310		13	98213298	98242825
A2	ENSESTT00000040311		13	98215060	98242825
A2	ENSESTT00000040312		13	98215103	98242825
A2	OTTHUMT00013002986	CLYBL-007	13	98216572	98243149
A2	ENSESTT00000040313		13	98216572	98243149
A2	OTTHUMT00013002985	CLYBL-006	13	98221273	98241868
A2	ENSESTT00000040314		13	98235260	98241868
A2	OTTHUMT00013003004	bA12G12.1-001	13	98315452	98322164
A2	ENST000000267294	ZIC5	13	98315452	98322179
A2	OTTHUMT00013002994	ZIC2-001	13	98332294	98337019
A2	ENST000000245295	ZIC2	13	98332320	98337019
A2	ENSESTT00000040315	ZIC2-002	13	98332599	98335720
A2	OTTHUMT00013002995		13	98334544	98335747
A2	ENSESTT00000040316		13	98334544	98335747
A2	OTTHUMT00013002997	ZIC2-004	13	98334944	98335747
A2	ENSESTT00000040317		13	98334944	98335747
A2	OTTHUMT00013002998	ZIC2-005	13	98335044	98335729
A2	ENSESTT00000040318		13	98335044	98335729
A2	ENSESTT00000040319		13	98335196	98335747
A2	OTTHUMT00013002996	ZIC2-003	13	98335749	98336159
A2	ENSESTT00000040320		13	98335749	98336160
A2	OTTHUMT00013003006	bA12G12.3-001	13	98378024	98378429
A2	OTTHUMT00013003008	bA12G12.4-001	13	98412551	98413856
A2	ENSESTT00000040321		13	98439330	98660115
A2	OTTHUMT00013003012	PCCA-001	13	98439338	98880687
A2	ENSESTT00000040322		13	98439361	98660115
A2	ENSESTT00000040323		13	98439372	98660115

TABLE 3 (Continued)

A2	ENSESTT000000040324				
A2	ENST00000310787	PCCA	13	98439395	98660115
A2	OTTHUMT00013003017	PCCA-006	13	98453138	98880421
A2	OTTHUMT00013003010	bA340C20.2-001	13	98499456	98511880
A2	ENSESTT000000040325		13	98500772	98501347
A2	OTTHUMT00013003014	PCCA-003	13	98585858	98660115
A2	ENSESTT000000040326		13	98643479	98775986
A2	ENSESTT000000040327		13	98643479	98881032
A2	ENSESTT000000040328		13	98643479	98881032
A2	OTTHUMT00013003013	PCCA-002	13	98643479	98881032
A2	ENSESTT000000040329		13	98656031	98690514
A2	OTTHUMT00013003015	PCCA-004	13	98660116	98881032
A2	OTTHUMT00013003016	PCCA-005	13	98718727	98880687
A2	OTTHUMT00013003028	bA151A6.5-001	13	98718754	98842072
A2	OTTHUMT00013003030	bA151A6.5-003	13	98814695	98830540
A2	OTTHUMT00013003029	bA151A6.5-002	13	98829802	98831270
A2	ENSESTT000000040330		13	98829814	98831412
A2	OTTHUMT00013003018	PCCA-007	13	98865680	98881032
A2	OTTHUMT00013003052	bA151A6.2-001	13	98865682	98880687
A2	ENST00000257302	Q9BT41	13	98881802	98934252
A2	ENSESTT000000040335		13	98881812	98883998
A2	ENSESTT000000040336		13	98882280	98934255
A2	ENSESTT000000040338		13	98882742	98934255
A2	OTTHUMT00013003055	bA151A6.2-004	13	98882742	98939783
A2	OTTHUMT00013003054	bA151A6.2-003	13	98882750	98883924
A2	ENSESTT000000040337		13	98882750	98939783
A2	OTTHUMT00013003056	bA151A6.2-005	13	98882766	98883908
A2	OTTHUMT00013003053	bA151A6.2-002	13	98882769	98883908
A2	OTTHUMT00013003034	bA151A6.4-001	13	98882769	98938986
A2	OTTHUMT00013003026	bA151A6.3-001	13	98887578	98930372
A2			13	98890071	98890529

TABLE 3 (Continued)

A2	ENST000000245316			13	98890156	98890503
A2	OTTHUMT00013003036	bA113J24.1-001		13	98954189	99025171
A2	OTTHUMT00013003037	bA113J24.1-002		13	98954189	99025171
A2	ENST000000245302	NM_032813		13	98955249	98989063
A2	ENSESTT00000040332			13	98975664	98987865
A2	ENSESTT00000040334			13	98975708	98986863
A2	OTTHUMT00013003038	bA113J24.1-003		13	98975708	98992566
A2	OTTHUMT00013003042	bA113J24.1-007		13	98975790	98986863
A2	ENSESTT00000040333			13	98976035	98987865
A2	OTTHUMT00013003041	bA113J24.1-006		13	98985320	98986887
A2	OTTHUMT00013003039	bA113J24.1-004		13	98992475	99025134
A2	ENSESTT00000040331			13	98992500	99014571
A2	ENSESTT00000040306			13	99006632	99025080
A2	ENSESTT00000040307			13	99013216	99025060
A2	ENSESTT00000040308			13	99018487	99020990
A2	ENSESTT00000040305			13	99018833	99025134
A2	OTTHUMT00013003043	bA113J24.1-008		13	99018834	99025134
A2	OTTHUMT00013003040	bA113J24.1-005		13	99018996	99020990
A2	OTTHUMT00013003066	bA430M15.1-001		13	99058580	99409639
A2	OTTHUMT00013003062	bA190K16.2-001		13	99106806	99107314
A2	ENST000000310576			13	99106812	99107311
A2	ENST000000310558	Q9BXE6		13	99111961	99112335
A2	OTTHUMT00013003064	bA118F16.1-001		13	99291117	99294619
A3	ENSESTT00000026233			5	175066018	175091447
A3	ENST000000231683	HRH2		5	175091160	175092239
A3	ENST000000274620	CPLX2		5	175204533	175288154
A3	ENST000000274615	Q96NN7		5	175288871	175289290
A3	ENST000000334259	Q8N9L3		5	175289858	175290319
A3	ENST000000265097	THOC3		5	175367459	175376203
A3	ENST000000333723			5	175414077	175415294



TABLE 3 (Continued)

A3	ENST000000331171	5	175414077	175415309
A3	ENST000000330220	5	175414083	175415294
A3	ENST000000253490	5	175492772	175517499
A3	ENSETT00000026234	5	175492798	175504815
A3	ENSETT00000026235	5	175514024	175528803
A3	ENSETT00000026236	5	175531948	175533047
A3	ENSETT00000026237	5	175532319	175534252
A3	ENSETT00000026238	5	175646358	175697849
A3	ENSETT00000026239	5	175646582	175697880
A3	ENST000000303137	5	175671357	175753911
A3	ENSETT00000026240	5	175702967	175753921
A3	ENST000000330147	5	175714285	175714659
A3	ENST000000332772	5	175721351	175753371
A3	ENST000000298569	5	175753991	175769668
A3	ENSETT00000026241	5	175755867	175762014
A3	ENSETT00000026242	5	175758565	175763625
A3	ENST000000310389	5	175773428	175781426
A3	ENSETT00000026243	5	1757773498	175776896
A3	ENST000000327101	5	175791865	175796511
A3	ENSETT00000026244	5	175795923	175797685
A3	ENST000000274787	5	175796696	175797683
A3	ENSETT00000026253	5	175800471	175824467
A3	ENST000000310407	5	175800698	175824287
A3	ENST000000310418	5	175800698	175824287
A3	ENSETT00000026254	5	175800716	175824462
A3	ENSETT00000026246	5	175856279	175904920
A3	ENSETT00000026245	5	175856279	175915561
A3	ENST000000261942	5	175856301	175917997
A3	ENSETT00000026247	5	175856353	175861483
A3	ENSETT00000026248	5	175907924	175914952

TABLE 3 (Continued)

A3	ENST000000274811	RNF44	5	175934638	175940396
A3	ENSESTT00000026249		5	175957282	175983069
A3	ENST000000261944	NM_017675	5	175957315	176003596
A3	ENSESTT00000026250		5	175986469	175992466
A3	ENSESTT00000026251		5	175994575	176000693
A3	ENSESTT00000026252		5	175994607	176000693
A3	ENST000000303991	NM_052899	5	176003728	176018054
A3	ENST000000335532	Q96PZ4	5	176004664	176007764
A3	ENST000000310112	SNCB	5	176028134	176037898
A3	ENST000000318682		5	176051522	176053904
A3	ENSESTT00000025931		5	176052504	176054064
A3	ENST000000310032	Q96S98	5	176055391	176066978
A3	ENSESTT00000025934		5	176055433	176064052
A3	ENSESTT00000025933		5	176055433	176065755
A3	ENSESTT00000025932		5	176055433	176065798
A3	ENST000000274797	FBXO23	5	176055504	176060711
A3	ENSESTT00000025937		5	176055510	176064052
A3	ENSESTT00000025936		5	176055510	176065755
A3	ENSESTT00000025935		5	176055510	176065798
A3	ENST000000298564	Q96FV3	5	176055540	176064848
A3	ENSESTT00000025938		5	176059752	176065560
A3	ENST000000318314	Q9H7Q1	5	176062303	176065622
A3	ENST000000329542		5	176270544	176282324
A3	ENSESTT00000025945		5	176276066	176278347
A3	ENST000000261961	Q96GP4	5	176281909	176287810
A3	ENSESTT00000025946		5	176281927	176285515
A3	ENST000000292432	HK3	5	176288997	176304083
A3	ENST000000323774	Q9BZR1	5	176313206	176377614
A3	ENST000000274827	NM_016290	5	176313206	176390539
A3	ENSESTT00000025947		5	176323181	176337765

TABLE 3 (Continued)

A3	ENST000000261948	NM_012279	5	176430663	176472523
A3	ENSESTT00000025948		5	176430665	176472752
A3	ENSESTT00000025949		5	176452251	176458816
A3	ENSESTT00000025951		5	176494862	176499035
A3	ENSESTT00000025950		5	176494862	176500300
A3	ENSESTT00000025952		5	176494947	176500300
A3	ENST00000292408	FGFR4	5	176497522	176505600
A3	ENST00000292410	NM_022963	5	176497527	176505600
A3	ENSESTT00000025956		5	176500568	176504578
A3	ENSESTT00000025957		5	176501099	176504578
A3	ENSESTT00000025958		5	176505115	176506050
A3	ENSESTT00000025959		5	176505286	176507234
A3	ENSESTT00000025960		5	176541049	176612169
A3	ENST00000298507	NSD1	5	176543028	176703698
A3	ENSESTT00000025961		5	176543093	176545330
A3	ENSESTT00000025963		5	176612187	176617686
A3	ENSESTT00000025966		5	176619693	176654715
A3	ENST00000312855		5	176673510	176674522
A3	ENSESTT00000025977		5	176699894	176702992
A3	ENSESTT00000025979		5	176709391	176710012
A3	ENST00000303270	RAB24	5	176709392	176711227
A3	ENSESTT00000025981		5	176711722	176714120
A3	ENSESTT00000025980		5	176711722	176714888
A3	ENST00000303204	PX19_HUMAN	5	176711736	176714888
A3	ENST00000303182	Q96ME3	5	176715058	176719769
A3	ENST00000303165	MXD3	5	176715151	176719769
A3	ENST00000303127	LMAN2	5	176739703	176759624
A3	ENSESTT00000025989		5	176765891	176779165
A3	ENST00000303066	RGS14	5	176765973	176780117
A3	ENSESTT00000025990		5	176775288	176776866

TABLE 3 (Continued)

TABLE 3 (Continued)

A3	ENSESTT00000026016			5	176897716	177038203
A3	ENST00000330641	Q96C91		5	176898295	176904318
A3	ENST00000331981	Q9BXB8		5	176898906	176904318
A3	ENST00000312943	Q9BQB3		5	176909731	176916090
A3	ENST00000274826	NM_024872		5	176911807	176917676
A3	ENST00000330503	DDX41		5	176919402	176924661
A3	ENSESTT00000026010			5	176926890	176943796
A3	ENST00000329540	NM_019057		5	176926890	176961637
A3	ENSESTT00000026015			5	176945068	177094067
A3	ENSESTT00000026011			5	176999291	177002623
A3	ENSESTT00000026013			5	176999295	177133284
A3	ENSESTT00000026012			5	176999295	177136090
A3	ENST00000328179	NM_017510		5	176999300	177003200
A3	ENSESTT00000026014			5	176999308	177136081
A3	ENSESTT00000035756			5	177000737	177003218
A3	ENSESTT00000035757			5	177000783	177136346
A3	ENSESTT00000035758			5	177001245	177136718
A3	ENSESTT00000035760			5	177007252	177150698
A3	ENST00000333469	NM_005451		5	177023996	177038192
A3	ENSESTT00000035801			5	177024173	177038191
A3	ENST00000292374	Q14250		5	177024246	177037114
A3	ENST00000331561	Q9BXB9		5	177024246	177037114
A3	ENST00000331867	Q96C91		5	177024246	177037114
A3	ENSESTT00000035800			5	177031099	177037114
A3	ENSESTT00000035802			5	177031469	177038195
A3	ENST00000332347	Q9BXB8		5	177031684	177037209
A3	ENST00000331704			5	177031702	177037114
A3	ENST00000333364	NM_024872		5	177042509	177048868
A3	ENSESTT00000035798			5	177044585	177050454
A3	ENSESTT00000035797			5	177045241	177050448
A3				5	177045345	177050987

TABLE 3 (Continued)

A3	ENSESTT00000035799			5	177045385	177050435
A3	ENST00000330228		DDX41	5	177052393	177057440
A3	ENSESTT00000035796			5	177060391	177064902
A3	ENSESTT00000035761			5	177060392	177077299
A3	ENST00000274788		NM_019057	5	177060394	177072665
A3	ENSESTT00000035795			5	177065352	177077000
A3	ENSESTT00000035794			5	177078577	177094163
A3	ENSESTT00000035759			5	177132801	177136335
A3	ENST00000332598		NM_017510	5	177132810	177136711
A3	ENST00000029410		B4GALT7	5	177140813	177150931
A3	ENSESTT00000035762			5	177151883	177159317
A3	ENST00000302857		Q9HAI8	5	177159504	177159962
A3	ENST00000318185			5	177166961	177173303
A3	ENST00000303108		NM_173663	5	177263967	177321278
A3	ENST00000324610			5	177269572	177285570
A3	ENSESTT00000035793		Q8TE30	5	177281869	177293899
A3	ENST00000329355			5	177314834	177318658
A3	ENST00000331417			5	177377030	177378248
A3	ENST00000328082		THOC3	5	177377030	177378266
A3	ENST00000303154			5	177416128	177424868
A3	ENSESTT00000035763		Q9H7L9	5	177416183	177424870
A3	ENST00000332215		PROP1	5	177511798	177512883
A3	ENST00000308304			5	177532838	177536844
A3	ENSESTT00000035764			5	177582334	177589578
A3	ENSESTT00000035765			5	177589720	177594471
A3	ENSESTT00000035766			5	177593021	177594534
A3	ENST00000332649		Y341_HUMAN	5	177596176	177596784
A3	ENST00000274605			5	177654157	177663002
A3	ENSESTT00000035767		YE01_HUMAN	5	177660981	177662330
A3	ENST00000313376			5	177671613	177689151

TABLE 3 (Continued)

A3	ENSESTT000000035769			5	177671744	177688239
A3	ENSESTT000000035768			5	177671744	177689170
A3	ENSESTT000000035770			5	177684377	177689170
A3	ENSESTT000000035792			5	177690065	177694571
A3	ENST00000274606		NOLA2	5	177690069	177694497
A3	ENST00000327842		NM_022471	5	177726321	177727901
A3	ENST00000261953		HNRPA2	5	177745109	177751782
A3	ENSESTT000000035781			5	177745132	177746614
A3	ENSESTT000000035779			5	177745132	177751397
A3	ENSESTT000000035780			5	177745132	177751397
A3	ENSESTT000000035777			5	177745132	177751563
A3	ENSESTT000000035778			5	177745132	177751563
A3	ENSESTT000000035771			5	177745132	177751762
A3	ENSESTT000000035772			5	177745132	177751762
A3	ENSESTT000000035773			5	177745132	177751762
A3	ENSESTT000000035774			5	177745132	177751762
A3	ENSESTT000000035775			5	177745132	177751762
A3	ENSESTT000000035776			5	177745132	177751762
A3	ENST00000307328		NM_004499	5	177745440	177751225
A3	ENSESTT000000035782			5	177746443	177751762
A3	ENSESTT000000035783			5	177747326	177751762
A3	ENSESTT000000035790			5	177749103	177770674
A3	ENSESTT000000035787			5	177749103	177772179
A3	ENST00000308158		NM_032921	5	177749186	177773152
A3	ENSESTT000000035791			5	177749189	177763185
A3	ENSESTT000000035788			5	177749189	177772179
A3	ENSESTT000000035789			5	177749225	177772179
A3	ENSESTT000000035784			5	177750732	177751762
A3	ENSESTT000000035786			5	177779162	177788865
A3	ENSESTT000000035785			5	177891469	177892852





TABLE 3 (Continued)

A3	ENST000000274609	ADAMTS2	5	178691731	178885702
A3	ENSESTT00000025805		5	178692740	178699439
A3	ENSESTT00000025804		5	178917905	178919135
A3	ENSESTT00000035851		5	179043326	179055582
A3	ENSESTT00000035852		5	179090766	179129747
A3	ENSESTT00000035853		5	179099890	179129747
A3	ENSESTT00000035854		5	179099924	179129747
A3	ENST000000319449		5	179100164	179146212
A3	ENSESTT00000035855		5	179100278	179107690
A3	ENSESTT00000035856		5	179107577	179131807
A3	ENSESTT00000035857		5	179133252	179146705
A3	ENST000000319571	NM_030970	5	179140510	179140581
A3	ENST000000258707		5	179148300	179148368
A3	ENSESTT00000035915		5	179150871	179154755
A3	ENSESTT00000035916		5	179150871	179154755
A3	ENSESTT00000035908		5	179150871	179160390
A3	ENSESTT00000035909		5	179150871	179160390
A3	ENST000000326748	HNRPH1	5	179150872	179160359
A3	ENSESTT00000035918		5	179151147	179154344
A3	ENSESTT00000035910		5	179151147	179160390
A3	ENSESTT00000035917		5	179151282	179154755
A3	ENSESTT00000035911		5	179151282	179160390
A3	ENST000000329433		5	179152814	179157705
A3	ENSESTT00000035914		5	179154867	179159858
A3	ENSESTT00000035912		5	179154867	179160364
A3	ENSESTT00000035913		5	179157887	179160362
A3	ENST000000331874	Q8NA96	5	179176906	179177448
A3	ENSESTT00000035858		5	179184188	179186866
A3	ENST000000328856	Q86VE1	5	179184188	179187649
A3	ENSESTT00000035859		5	179215326	179231463

TABLE 3 (Continued)

A3	ENSESTT000000035907			179215692	179217634
A3	ENST000000329156			179230857	179231354
A3	ENSESTT00000035861			179235589	179245048
A3	ENSESTT00000035860			179235589	179267552
A3	ENST000000247461		CANX	179235655	179267584
A3	ENSESTT00000035865			179240421	179242025
A3	ENSESTT00000035862			179243792	179267552
A3	ENSESTT00000035863			179246533	179256391
A3	ENSESTT00000035864			179263334	179267552
A3	ENST000000292599			179269772	179313948
A3	ENSESTT00000035866		MAML1	179303154	179307853
A3	ENST000000298607			179314421	179314996
A3	ENST000000292596		NM_024978	179330648	179333175
A3	ENSESTT00000035868		LTC4S	179330696	179333148
A3	ENSESTT00000035869			179330774	179333175
A3	ENSESTT00000035870			179332229	179332994
A3	ENSESTT00000035867			179332243	179333174
A3	ENST000000292591			179334262	179343246
A3	ENSESTT00000035906		MGAT4B	179334633	179337617
A3	ENSESTT00000035901			179334633	179338133
A3	ENSESTT00000035902			179334633	179338133
A3	ENSESTT00000035895			179334633	179343595
A3	ENSESTT00000035903			179334876	179338133
A3	ENSESTT00000035904			179334883	179338133
A3	ENSESTT00000035900			179334883	179342992
A3	ENSESTT00000035896			179334883	179343595
A3	ENSESTT00000035897			179334883	179343595
A3	ENSESTT00000035905			179335007	179338133
A3	ENSESTT00000035898			179335007	179343595
A3	ENSESTT00000035899			179337988	179343595

TABLE 3 (Continued)

A3	ENSESTT00000035871			179357567	179374487
A3	ENST00000292588		SQSTM1	179357599	179373255
A3	ENSESTT00000035894			179370411	179373916
A3	ENST00000292586		NM_016175	179373936	179378682
A3	ENSESTT00000035893			179373938	179395443
A3	ENST00000328625		NM_016175	179374053	179395458
A3	ENST00000261956075163			179398735	179444516
A3	ENST00000312107		NM_015043	179400110	179407115
A3	ENSESTT00000035892			179400203	179402065
A3	ENSESTT00000035891			179400212	179402552
A3	ENSESTT00000035890			179400359	179404512
A3	ENSESTT00000035889			179409551	179415194
A3	ENSESTT00000035887			179415747	179444521
A3	ENSESTT00000035888			179416330	179444521
A3	ENSESTT00000035886			179492143	179507146
A3	ENSESTT00000035885			179492144	179514948
A3	ENSESTT00000035884			179492144	179549976
A3	ENSESTT00000035881		RNF130	179492144	179608429
A3	ENST00000261947			179492168	179608763
A3	ENSESTT00000035882			179514859	179608429
A3	ENSESTT00000035883			179516790	179608429
A3	ENST00000332144			179622379	179623665
A3	ENST00000274820		NM_175062	179638729	179745830
A3	ENST00000316131			179763049	179763664
A3	ENSESTT00000035880			179772812	179779418
A3	ENSESTT00000035877			179772812	179817172
A3	ENST00000057533		NM_139069	179773046	179817223
A3	ENST00000316123		MAPK9	179773046	179817223
A3	ENSESTT00000035879			179783749	179798444
A3	ENSESTT00000035878			179790169	179801503

TABLE 3 (Continued)

A3	ENST000000328081					5	179794621	179796637
A3	ENSESTT00000035876					5	179816486	179828537
A3	ENST000000253778				GFTT2	5	179837361	179875263
A3	ENSESTT00000035874					5	179837891	179868310
A3	ENSESTT00000035875					5	179861517	179867483
A3	ENSESTT00000035873					5	179868152	179889985
A3	ENSESTT00000035872					5	179872531	179889987
A3	ENST000000261951				NM_015455	5	180065924	180110862
A3	ENSESTT00000035640					5	180065968	180087268
A3	ENSESTT00000035639					5	180065968	180101184
A3	ENST000000332929				Q8TAJ0	5	180112873	180113151
A3	ENSESTT00000035680					5	180126767	180128147
A3	ENST000000292641				SCGB3A1	5	180126768	180128145
A3	ENSESTT00000035679					5	180139821	180148082
A3	ENST000000261937				FLT4	5	180145626	180186207
A3	ENSESTT00000035678					5	180162667	180166645
A3	ENSESTT00000035677					5	180166890	180186286
A3	ENST000000315712				Q8NHB0	5	180229572	180230422
A3	ENST000000307832				Q8NGV0	5	180275785	180276720
A3	ENSESTT00000035676					5	180327203	180328628
A3	ENSESTT00000035675					5	180327203	180328768
A3	ENST000000333055				MGAT1	5	180327210	180352203
A3	ENSESTT00000035663					5	180327543	180339485
A3	ENST000000307826				Q8NBL8	5	180328296	180329633
A3	ENSESTT00000035662					5	180329112	180339503
A3	ENSESTT00000035659					5	180329155	180345445
A3	ENSESTT00000035661					5	180329332	180340541
A3	ENSESTT00000035665					5	180332068	180352229
A3	ENSESTT00000035664					5	180332092	180339429
A3	ENSESTT00000035660					5	180332309	180345357

TABLE 3 (Continued)

A3	ENSESTT00000035658			180344545	180346738
A3	ENSESTT00000035666		5	180345508	180352200
A3	ENSESTT00000035657		5	180345511	180346792
A3	ENSESTT00000035673		5	180384273	180397228
A3	ENSESTT00000035672		5	180384335	180397947
A3	ENST00000330037	NM_152283	5	180385559	180387766
A3	ENST00000302108		5	180386417	180388132
A3	ENSESTT00000035674		5	180387577	180397213
A3	ENST00000231229	NM_024850	5	180435821	180487566
A3	ENSESTT00000035641		5	180435955	180448194
A3	ENSESTT00000035642		5	180448211	180487568
A3	ENST00000301996	BTNL3	5	180525529	180543025
A3	ENST00000298708	NM_152547	5	180582152	180590225
A3	ENSESTT00000035643		5	180589782	180591964
A3	ENST00000327705	Q8N324	5	180590141	180598180
A3	ENSESTT00000035644		5	180592305	180595974
A3	ENST00000328095		5	180635802	180637319
A3	ENST00000328767		5	180650805	180651920
A3	ENST00000329365	Q8NGV1	5	180661176	180661966
A3	ENST00000328275		5	180691605	180692552
A3	ENSESTT00000035645	Q96J89	5	180728586	180731091
A3	ENST00000274773		5	180731275	180736815
A3	ENSESTT00000035646		5	180734864	180739766
A3	ENSESTT00000035671		5	180739916	180741785
A3	ENST00000334421	TRIM7	5	180740159	180741772
A3	ENST00000312487	Q96Q10	5	180760899	180772041
A3	ENST00000315073	TRIM41	5	180760917	180772467
A3	ENSESTT00000035647		5	180769651	180772470
A3	ENSESTT00000035648		5	180770071	180772470
A3	ENST00000274821	GNB2L1	5	180773587	180780586

TABLE 3 (Continued)

A3	ENSESTT000000035670			5	180773591	180776245
A3	ENSESTT000000035649			5	180783187	180783850
A3	ENSESTT000000035669			5	180791085	180796857
A3	ENST00000327725		NM_022907	5	180792443	180792880
A3	ENSESTT000000035668			5	180793051	180796920
A3	ENSESTT000000035667			5	180793672	180796987
A3	ENST00000327767		TRIM52	5	180794077	180797476
A3	ENSESTT000000035652			5	180797875	180800890
A3	ENSESTT000000035651			5	180797875	180800918
A3	ENSESTT000000035650			5	180797875	180800920
A3	ENSESTT000000035653			5	180854088	180864732
A3	ENSESTT000000035654			5	180866068	180886905
A3	ENST00000333864		O4F3_HUMAN	5	180903950	180904888
A3	ENSESTT000000035655			5	180988607	180991662
A3	ENSESTT000000035656			5	180990904	180991624
A3	ENST00000332522			5	181008629	181009085
A4	OTTHUMT00013000706		FLT1-001	13	26672489	26867232
A4	ENST00000282397		FLT1	13	26675304	26867254
A4	ENSESTT000000037419			13	26740528	26762136
A4	ENSESTT000000037420			13	26749569	26762136
A4	ENSESTT000000037421			13	26756741	26762136
A4	ENSESTT000000037417			13	26769173	26810483
A4	ENSESTT000000037415			13	26769173	26839090
A4	ENSESTT000000037418			13	26772654	26810483
A4	ENSESTT000000037416			13	26772654	26839090
A4	ENSESTT000000037414			13	26839038	26867241
A4	OTTHUMT00013000708		bA57H24.1-001	13	26970970	26972189
A4	ENST00000255315		C13orf12	13	27031241	27051059
A4	OTTHUMT00013000710		bA97E23.1-001	13	27031241	27051062
A4	OTTHUMT00013000711		bA97E23.1-002	13	27031241	27051062

TABLE 3 (Continued)

A4	ENSESTT00000037329	13	27031251	27051047
A4	ENSESTT00000037330	13	27031270	27034993
A4	ENSESTT00000037328	13	27032876	27050475
A4	ENSESTT00000037342	13	27044487	27050337
A4	OTTHUMT00013000715	13	27072201	27076694
A4	ENST00000266943	13	27072854	27090734
A4	OTTHUMT00013000714	13	27072854	27091107
A4	ENSESTT00000037341	13	27073385	27082982
A4	ENSESTT00000037340	13	27073407	27085276
A4	ENSESTT00000037339	13	27085474	27091111
A4	OTTHUMT00013000718	13	27094523	27096158
A4	ENSESTT00000037338	13	27094840	27095270
A4	OTTHUMT00013000720	13	27150695	27151074
A4	ENST00000255289	13	27397451	27875542
A4	OTTHUMT00013000739	13	27397451	27875892
A4	OTTHUMT00013000726	13	27611516	27622691
A4	OTTHUMT00013000725	13	27611760	27622691
A4	OTTHUMT00013000724	13	27611924	27622691
A4	ENSESTT00000037331	13	27653849	27673230
A4	OTTHUMT00013000722	13	27678843	27680052
A4	OTTHUMT00013000738	13	27800764	27875873
A4	ENSESTT00000037332	13	27800922	27869445
A4	ENST00000323380	13	27848687	27859887
A4	OTTHUMT00013000730	13	27849033	27859887
A4	ENSESTT00000037337	13	27849033	27859887
A4	OTTHUMT00013000732	13	27881547	27967721
A4	ENST00000266949	13	27886617	27908325
A4	OTTHUMT00013000733	13	27889004	27891647
A4	ENSESTT00000037336	13	27889008	27894543
A4	ENSESTT00000037335	13	27894554	27902860
	bA97E23.2-002			
	NM 181785			
	bA97E23.2-001			
	bA97E23.3-001			
	bA161P17.1-001			
	Q8N5E2			
	bA274A8.1-002			
	bA351N4.3-003			
	bA351N4.3-002			
	bA351N4.3-001			
	bA351N4.2-001			
	bA274A8.1-001			
	Q8N642			
	bA274A8.2-001			
	SLC7A1-001			
	SLC7A1			
	SLC7A1-002			

TABLE 3 (Continued)

A4	ENSESTT00000037333			13	27907953	27967721
A4	ENSESTT00000037334			13	27907955	27958929
A4	OTTHUMT00013000734			13	27907961	27958929
A4	ENST000000330321	SLC7A1-003		13	27964863	27965033
A4	ENST000000255303	Q8NI69		13	28014062	28017889
A4	ENST000000310635	Q8TE30		13	28017953	28018969
A4	OTTHUMT00013000746	Q9P1E1		13	28136508	28222821
A4	ENST000000241470	UBL3-001		13	28136546	28222715
A4	ENSESTT00000037443			13	28138914	28222162
A4	ENSESTT00000037445			13	28139131	28144336
A4	ENSESTT00000037444			13	28139753	28222162
A4	OTTHUMT00013000744	bA90M5.2-001		13	28238096	28238306
A4	OTTHUMT00013000748	bA90M5.4-001		13	28290784	28298788
A4	ENSESTT00000037431			13	28310040	28322630
A4	ENST000000241471	Q9H523		13	28310043	28322495
A4	OTTHUMT00013000742	bA90M5.1-001		13	28310043	28322628
A4	OTTHUMT00013000750	bA629E24.1-001		13	28479753	28481012
A4	OTTHUMT00013000752	bA490N5.1-001		13	28526203	28526723
A4	OTTHUMT00013000754	bA374F3.1-001		13	28580177	28679585
A4	ENSESTT00000037442			13	28580405	28603509
A4	ENST000000261628	NM_032116		13	28580617	28679163
A4	ENSESTT00000037439			13	28627583	28655933
A4	ENSESTT00000037440			13	28627583	28679620
A4	ENSESTT00000037438			13	28627618	28679146
A4	ENSESTT00000037441			13	28627625	28679181
A4	OTTHUMT00013000756	bA374F3.2-001		13	28668272	28668860
A4	ENST000000319015			13	28668284	28668872
A4	OTTHUMT00013000758	bA374F3.3-001		13	28688497	28692033
A4	OTTHUMT00013000761	bA374F3.4-002		13	28713496	28736232
A4	ENSESTT00000037437			13	28713496	28736232



TABLE 3 (Continued)

A4	OTTHUMT00013000760	bA374F3.4-001	13	28714620	28737898
A4	OTTHUMT00013000763	bA374F3.4-004	13	28729879	28736287
A4	OTTHUMT00013000762	bA374F3.4-003	13	28729879	28749282
A4	OTTHUMT00013000764	bA374F3.4-005	13	28735317	28745169
A4	OTTHUMT00013000765	bA374F3.4-006	13	28746140	28749101
A4	OTTHUMT00013000772	bA223E19.1-001	13	28800091	28800795
A4	ENST00000302464	UBE2L3	13	28800128	28800592
A4	OTTHUMT00013000792	bA550P23.2-001	13	28818545	28820625
A4	OTTHUMT00013000777	HMGB1-004	13	28831990	28838109
A4	ENST00000255320	HMGB1	13	28831997	28838013
A4	ENSESTT00000037436		13	28833364	28838063
A4	OTTHUMT00013000774	HMGB1-001	13	28833566	28836447
A4	OTTHUMT00013000775	HMGB1-002	13	28833621	28836447
A4	OTTHUMT00013000776	HMGB1-003	13	28833633	28838075
A4	ENSESTT00000037435		13	28834423	28989492
A4	OTTHUMT00013000781	HMGB1-008	13	28834483	28835401
A4	OTTHUMT00013000782	HMGB1-009	13	28834675	28836526
A4	ENSESTT00000037434		13	28834713	28989872
A4	OTTHUMT00013000779	HMGB1-006	13	28834750	28836793
A4	OTTHUMT00013000778	HMGB1-005	13	28835348	28838651
A4	OTTHUMT00013000780	HMGB1-007	13	28835448	28838051
A4	OTTHUMT00013000794	bA550P23.3-001	13	28911734	28915598
A4	OTTHUMT00013000796	bA550P23.4-001	13	28913780	28915034
A4	OTTHUMT00013000798	bA550P23.5-001	13	28925807	28926830
A4	OTTHUMT00013000801	bA121O19.1-002	13	28989830	29003611
A4	ENST00000255304	NM_005800	13	28989920	29031493
A4	OTTHUMT00013000800	bA121O19.1-001	13	28989920	29031686
A4	ENSESTT00000037432		13	28990053	29003351
A4	ENSESTT00000037433		13	28990087	29003261
A4	ENSESTT00000042385		13	29014843	29031687

TABLE 3 (Continued)

A4	OTTHUMT00013000806	ALO5AP-001	13	29107645	29136556
A4	ENST00000255317	ALO5AP	13	29107669	29136562
A4	OTTHUMT00013000807	ALO5AP-002	13	29114473	29116533
A4	OTTHUMT00013000804	bA469L23.2-001	13	29175343	29182782
A4	ENSESTT00000042392		13	29175343	29183024
A4	ENSESTT00000042393		13	29202772	29255532
A4	OTTHUMT00013000810	bA252M21.1-001	13	29254688	29255532
A4	ENSESTT00000042394		13	29254696	29255532
A4	ENST00000218987	NM_032849	13	29278328	29297708
A4	OTTHUMT00013000812	bA252M21.2-001	13	29278328	29297709
A4	OTTHUMT00013000813	bA252M21.2-002	13	29278843	29296586
A4	ENSESTT00000042395		13	29289536	29297968
A4	ENSESTT00000042471		13	29302805	29303625
A4	OTTHUMT00013000816	bA252M21.3-001	13	29302814	29303619
A4	OTTHUMT00013000818	bA252M21.4-001	13	29303638	29304723
A4	OTTHUMT00013000819	bA252M21.4-002	13	29303766	29304337
A4	OTTHUMT00013000823	bA252M21.5-002	13	29304840	29305327
A4	OTTHUMT00013000822	bA252M21.5-001	13	29304840	29347639
A4	ENST00000320096	NM_152325	13	29304853	29347044
A4	ENSESTT00000042396		13	29329009	29347274
A4	OTTHUMT00013000826	bA252M21.6-001	13	29345426	29349760
A4	OTTHUMT00013000828	bA252M21.7-001	13	29367299	29368275
A4	OTTHUMT00013000830	bA173P16.1-001	13	29471238	29487836
A4	ENSESTT00000042440		13	29508750	29511044
A4	ENSESTT00000042437		13	29508750	29511319
A4	ENSESTT00000042416		13	29508750	29520230
A4	ENSESTT00000042418		13	29508750	29520230
A4	ENSESTT00000042420		13	29508750	29520230
A4	ENSESTT00000042421		13	29508750	29520230
A4	ENSESTT00000042403		13	29508750	29520554

TABLE 3 (Continued)

A4	ENSESTT00000042405			13	29508750	29520554
A4	ENSESTT00000042406			13	29508750	29520554
A4	ENSESTT00000042407			13	29508750	29520554
A4	ENSESTT00000042438			13	29508750	29520623
A4	ENSESTT00000042443			13	29508750	29520623
A4	ENSESTT00000042444			13	29508750	29520623
A4	ENSESTT00000042445			13	29508750	29520623
A4	ENSESTT00000042402			13	29508750	29523880
A4	ENSESTT00000042404			13	29508750	29523880
A4	ENSESTT00000042413			13	29508750	29523880
A4	ENSESTT00000042414			13	29508750	29523880
A4	ENSESTT00000042442			13	29508762	29509663
A4	OTTHUMT00013000835		ba173P16.2-004	13	29508762	29510705
A4	OTTHUMT00013000832		ba173P16.2-001	13	29508765	29534064
A4	OTTHUMT00013000833		ba173P16.2-002	13	29508765	29534064
A4	OTTHUMT00013000834		ba173P16.2-003	13	29508765	29534064
A4	ENSESTT00000042441			13	29509002	29511044
A4	ENSESTT00000042422			13	29509002	29520230
A4	ENSESTT00000042423			13	29509002	29520230
A4	ENSESTT00000042408			13	29509002	29520554
A4	ENSESTT00000042409			13	29509002	29520554
A4	ENSESTT00000042446			13	29509002	29520623
A4	ENSESTT00000042447			13	29509002	29520623
A4	ENSESTT00000042415			13	29509002	29523880
A4	ENSESTT00000042417			13	29509002	29523880
A4	ENST000000239887		HSPH1	13	29509455	29533719
A4	ENST000000320027		HSPH1	13	29509455	29533719
A4	ENSESTT00000042439			13	29509641	29511319
A4	ENSESTT00000042424			13	29510418	29520230
A4	ENSESTT00000042410			13	29510418	29520554

TABLE 3 (Continued)

A4	ENSESTT00000042448	13	29510418	29520623
A4	ENSESTT00000042419	13	29510418	29523880
A4	ENSESTT00000042425	13	29510574	29520230
A4	ENSESTT00000042432	13	29510574	29522321
A4	ENSESTT00000042428	13	29510574	29523880
A4	OTTHUMT00013000836	13	29510676	29511319
A4	ENSESTT00000042426	13	29510913	29520230
A4	ENSESTT00000042427	13	29510913	29520230
A4	ENSESTT00000042411	13	29510913	29520554
A4	ENSESTT00000042449	13	29510913	29520623
A4	ENSESTT00000042433	13	29510913	29522321
A4	ENSESTT00000042429	13	29510913	29523880
A4	ENSESTT00000042430	13	29510913	29523880
A4	ENSESTT00000042436	13	29515928	29520230
A4	ENSESTT00000042412	13	29515928	29520554
A4	ENSESTT00000042401	13	29515928	29520623
A4	ENSESTT00000042434	13	29515928	29522321
A4	ENSESTT00000042431	13	29515928	29523880
A4	ENSESTT00000042435	13	29520095	29522321
A4	ENSESTT00000042400	13	29527641	29534068
A4	ENSESTT00000042399	13	29527667	29534489
A4	ENSESTT00000042397	13	29572112	29633161
A4	OTTHUMT00013000842	13	29572112	29704409
A4	ENSESTT00000042398	13	29632535	29656892
A4	OTTHUMT00013000843	13	29632544	29656892
A4	ENST00000310319	13	29675357	29676373
A4	OTTHUMT00013000846	13	29683426	29685058
A4	ENST00000298386	13	30111674	30175009
A4	OTTHUMT00013000848	13	30111679	30175009
A4	ENSESTT00000037457	13	30218905	30325581

bA173P16.2-005

bA367C11.1-001

bA367C11.1-002  
Q9P1E1bA367C11.2-001  
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bA432E15.1-001

TABLE 3 (Continued)

A4	ENSESTT00000037458			13	30218972	30324856
A4	OTTHUMT00013000850	Em:AC002525.1-001		13	30324632	30325609
A4	ENST000000306722			13	30324717	30325498
A4	OTTHUMT00013000852	bA207N4.2-001		13	30397451	30403776
A4	OTTHUMT00013000854	bA37E23.1-001		13	30403437	30668794
A4	ENSESTT00000037459			13	30403557	30451064
A4	OTTHUMT00013000855	bA37E23.1-002		13	30403692	30410757
A4	ENSESTT00000037460			13	30403692	30410757
A4	ENST000000318671	Q9H551		13	30403933	30474153
A4	OTTHUMT00013000856	bA37E23.1-003		13	30433001	30489607
A4	ENST000000267067	Q99993		13	30457981	30529546
A4	ENSESTT00000037461			13	30533334	30543341
A4	ENSESTT00000037462			13	30545609	30551036
A4	ENST000000261575	NM_023037		13	30574067	30667597
A4	ENSESTT00000037446			13	30603413	30668738
A4	ENSESTT00000037447			13	30606797	30609886
A4	OTTHUMT00013000858	bA37E23.1-005		13	30621676	30650976
A4	ENSESTT00000037448			13	30621802	30637786
A4	ENSESTT00000037449			13	30626285	30634614
A4	ENSESTT00000037450			13	30626290	30637786
A4	ENSESTT00000037453			13	30626512	30650976
A4	ENSESTT00000037454			13	30626512	30650976
A4	ENSESTT00000037452			13	30626512	30661841
A4	ENSESTT00000037451	bA37E23.1-006		13	30626512	30661882
A4	OTTHUMT00013000859			13	30634526	30661776
A4	ENSESTT00000037455	bA37E23.1-004		13	30659981	30668767
A4	OTTHUMT00013000857			13	30659988	30667640
A4	ENSESTT00000037456			13	30666374	30668767
A4	OTTHUMT00013000870	bA37E23.5-001		13	30670291	30670849
A4	OTTHUMT00013000868	bA37E23.4-001		13	30680855	30683420

TABLE 3 (Continued)

A4	ENSESTT00000037463			13	30687607	30698292
A4	OTTHUMT00013003674	BRCA2-001		13	30687617	30771806
A4	ENSESTT00000037464			13	30687640	30698728
A4	ENST00000267071	BRCA2		13	30688598	30770907
A4	ENSESTT00000037465			13	30735410	30752226
A4	ENSESTT00000037466			13	30748806	30752226
A4	OTTHUMT00013003675	BRCA2-002		13	30751977	30770409
A4	OTTHUMT00013000866	bA37E23.3-001		13	30756797	30758245
A4	OTTHUMT00013000872	bA298P3.2-001		13	30773713	30800270
A4	OTTHUMT00013000873	bA298P3.2-002		13	30773810	30800270
A4	OTTHUMT00013000874	bA298P3.2-003		13	30773814	30788840
A4	OTTHUMT00013000875	bA298P3.2-004		13	30773954	30800151
A4	ENSESTT00000037479			13	30774634	30800259
A4	ENSESTT00000037481	NM_052818		13	30774983	30779922
A4	ENST00000267044	Q8WTU5		13	30775079	30779464
A4	ENST00000306588			13	30775281	30800219
A4	OTTHUMT00013000876	bA298P3.2-005		13	30775816	30800151
A4	OTTHUMT00013000878	bA298P3.2-007		13	30778590	30800143
A4	ENST00000332066	NM_014081		13	30779092	30779373
A4	OTTHUMT00013000877	bA298P3.2-006		13	30797059	30800151
A4	OTTHUMT00013000879	bA298P3.2-008		13	30797495	30805091
A4	ENSESTT00000037480			13	30797642	30800151
A4	OTTHUMT00013000888	bA298P3.3-001		13	30804554	30818619
A4	ENSESTT00000037478			13	30804625	30814984
A4	ENST00000267052	NM_033111		13	30804924	30818554
A4	ENSESTT00000037476			13	30815994	30910936
A4	OTTHUMT00013000896	bA11K16.4-001		13	30816130	30816268
A4	OTTHUMT00013000890	bA11K16.1-001		13	30849411	30850978
A4	OTTHUMT00013000892	bA11K16.2-001		13	30852732	30890057
A4	OTTHUMT00013000894	bA11K16.3-001		13	30864436	30870629

TABLE 3 (Continued)

A4	ENST000000267068	NM_014887	13	30889031	30910919
A4	OTTHUMT00013000897	bA11K16.4-002	13	30889031	30910919
A4	ENSESTT00000037473		13	30889508	30894409
A4	ENSESTT00000037471		13	30889508	30908302
A4	ENSESTT00000037474		13	30889684	30893770
A4	OTTHUMT00013000898	bA11K16.4-003	13	30889998	30908006
A4	ENSESTT00000037472		13	30899013	30908193
A4	ENSESTT00000037467		13	30907172	30908872
A4	ENSESTT00000037477		13	30908368	30910932
A4	ENSESTT00000037470		13	30908503	30910929
A4	OTTHUMT00013000899	bA11K16.4-004	13	30908564	30910962
A4	ENSESTT00000037475		13	30908708	30910962
A4	ENSESTT00000037468		13	30958592	31031343
A4	OTTHUMT00013000906	49J10.1-006	13	30958624	31118238
A4	ENST000000261578	APRIN	13	30958642	31145465
A4	OTTHUMT00013000907	49J10.1-007	13	30958685	31118238
A4	OTTHUMT00013000908	49J10.1-008	13	30958688	31024465
A4	ENSESTT00000037469		13	30958704	31021469
A4	OTTHUMT00013000904	49J10.1-002	13	30958706	31022754
A4	ENSESTT00000037369		13	31071946	31113272
A4	ENSESTT00000037370		13	31073121	31113272
A4	OTTHUMT00013000905	49J10.1-004	13	31073219	31079179
A4	ENSESTT00000037371		13	31073219	31079179
A4	OTTHUMT00013000915	bA380B4.1-002	13	31125470	31148043
A4	OTTHUMT00013000914	bA380B4.1-001	13	31125470	31150157
A4	ENSESTT00000037372		13	31130670	31143217
A4	OTTHUMT00013000918	bA380B4.2-001	13	31249569	31283788
A4	OTTHUMT00013000920	bA218A18.1-001	13	31325521	31326539
A4	ENSESTT00000037388		13	31385588	31388081
A4	OTTHUMT00013003671	KL-002	13	31388571	31436440

TABLE 3 (Continued)

A4	ENST00000255481KL			13	31388571	31438279
A4	OTTHUMT00013003670	KL-001		13	31388571	31438282
A4	OTTHUMT00013000926	bA81F11.1-001		13	31475278	31578143
A4	ENSEST00000037373			13	31476827	31478958
A4	ENSEST00000037386			13	31477004	31484030
A4	ENST00000255486	STARD13		13	31477730	31558159
A4	ENSEST00000037387			13	31482009	31484030
A4	OTTHUMT00013000930	bA81F11.1-005		13	31483921	31485330
A4	OTTHUMT00013000924	bA81F11.4-001		13	31494713	31495797
A4	ENSEST00000037374			13	31494713	31495802
A4	OTTHUMT00013000928	bA81F11.1-003		13	31501869	31558216
A4	ENSEST00000037379			13	31502223	31578161
A4	ENSEST00000037378			13	31502350	31722654
A4	OTTHUMT00013000929	bA81F11.1-004		13	31510566	31539759
A4	ENSEST00000037380			13	31510566	31539761
A4	OTTHUMT00013000927	bA81F11.1-002		13	31527573	31657844
A4	OTTHUMT00013000922	bA81F11.2-001		13	31530724	31536546
A4	ENSEST00000037385			13	31530724	31536546
A4	ENSEST00000037384			13	31547153	31657728
A4	OTTHUMT00013000936	bA81F11.3-001		13	31562078	31657873
A4	ENSEST00000037383			13	31647964	31657873
A4	OTTHUMT00013000938	bA363P13.1-001		13	31649690	31653471
A4	ENSEST00000037375			13	31649690	31653473
A4	ENSEST00000037381			13	31705816	31720135
A4	OTTHUMT00013000940	bA141M1.1-001		13	31705983	31707403
A4	ENSEST00000037382			13	31705983	31707414
A4	OTTHUMT00013000942	bA141M1.4-001		13	31720744	31722761
A4	ENSEST00000037377			13	31721064	31722742
A4	OTTHUMT00013000946	bA141M1.3-001		13	31727343	32048905
A4	OTTHUMT00013000948	bA141M1.3-003		13	31883467	31896459



TABLE 3 (Continued)

A4	ENSESTT00000037376			13	31883467	31896459
A4	OTTHUMT00013000944	bA37L2.1-001		13	31983104	31983659
A4	OTTHUMT00013000947	bA14M1.3-002		13	32026796	32048861
A4	OTTHUMT00013000954	bA179A7.2-001		13	32029573	32032065
A4	OTTHUMT00013000952	RFC3-001		13	32190203	32209633
A4	ENSESTT00000039806			13	32190245	32209644
A4	ENSESTT00000039805			13	32190245	32338382
A4	ENSESTT00000039804			13	32190245	32338695
A4	ENST00000255484	RFC3		13	32190316	32208432
A4	OTTHUMT00013000956	bA218I21.1-001		13	32454566	32455447
A4	OTTHUMT00013000958	bA266E6.1-001		13	32807587	33012822
A4	ENSESTT00000039807			13	32807587	33012822
A4	OTTHUMT00013000959	bA266E6.1-002		13	32905983	32906487
A4	ENSESTT00000039808			13	32905983	32906487
A4	OTTHUMT00013000962	bA266E6.2-001		13	32946341	32946803
A4	OTTHUMT00013000972	NBEA-001		13	33314456	34044873
A4	ENST00000310336	NBEA		13	33314958	34043128
A5	ENSESTT00000038767			7	101019421	101400637
A5	ENSESTT00000038766			7	101019421	101485396
A5	ENSESTT00000038765			7	101019421	101487431
A5	OTTHUMT00007006261	CUTL1		7	101019473	101487362
A5	ENST00000292538	CUTL1		7	101019492	101486563
A5	ENST00000292535	CUTL1		7	101021063	101453321
A5	ENSESTT00000038777			7	101081303	101082106
A5	ENSESTT00000038768			7	101119629	101231763
A5	ENSESTT00000038771			7	101273798	101400637
A5	ENSESTT00000038770			7	101273798	101485396
A5	ENSESTT00000038769			7	101273798	101487431
A5	ENSESTT00000038772			7	101362019	101397352
A5	OTTHUMT00007006649	mbhmh_gw729093.		7		



TABLE 3 (Continued)

TABLE 3 (Continued)

A5	ENSESTT00000038819	7	101685981	101793412
A5	ENSESTT00000038831	7	101691969	101794030
A5	ENSESTT00000038792	7	101694343	101794786
A5	ENSESTT00000038793	7	101694383	101794951
A5	ENSESTT00000038795	7	101694776	101695508
A5	ENSESTT00000038829	7	101697050	101702049
A5	ENSESTT00000038828	7	101697479	101707749
A5	ENSESTT00000038826	7	101697813	101801370
A5	ENSESTT00000038821	7	101710309	101817727
A5	ENSESTT00000038822	7	101713854	101813329
A5	ENSESTT00000038820	7	101724207	101823338
A5	ENSESTT00000038810	7	101739241	101839744
A5	ENSESTT00000038808	7	101739246	101866719
A5	ENSESTT00000038809	7	101739290	101866719
A5	ENST00000297278	7	101739330	101744501
A5	ENSESTT00000038804	7	101742184	101872640
A5	OTTHUMT00007007119	7	101742452	101773584
A5	ENST000000319405	7	101755410	101861246
A5	OTTHUMT00007006426			
A5	OTTHUMT00007008004	7	101757047	101763166
A5	ENSESTT00000038796	7	101763162	101768147
A5	ENSESTT00000038811	7	101766314	101869984
A5	ENST00000323465	7	101768689	101773566
A5	OTTHUMT00007006643	7	101768862	101773534
A5	ENSESTT00000038817	7	101774402	101780795
A5	ENSESTT00000038816	7	101783624	101884523
A5	ENST00000262940	7	101783749	101884558
A5	OTTHUMT00007006268	7	101783754	101817670
A5	ENSESTT00000038797	7	101783754	101817670
A5		7	101793580	101890696

TABLE 3 (Continued)

A5	ENSESTT00000038794	mbhnh_gw12844788.	7	101794005	101794745
A5	ENSESTT00000038827	100760681.100765918	7	101796283	101801278
A5	ENSESTT00000038825	.2.7	7	101796715	101806980
A5	OTTHUMT00007006314	mbhnh_ts.101.018.a	7	101838509	101841746
A5	OTTHUMT00007007045	Hs_7_c5035	7	101853330	101862231
A5	ENST00000312297	mbhnh_h_100048510	7	101855961	101858620
A5	OTTHUMT00007008008	100795952_m_	7	101862227	101867194
A5	ENSESTT00000038805	134702119	7	101867736	101872630
A5	OTTHUMT00007006195	Hs_7_c1585	7	101867909	101872582
A5	OTTHUMT00007007904	Hs_7_c1586	7	101879466	101879837
A5	OTTHUMT00007007905	Q96C79	7	101882816	101891453
A5	ENST00000329942	Hs_7_c1587	7	101889904	101890065
A5	ENSESTT00000038798		7	101889915	101890655
A5	OTTHUMT00007007907		7	101904290	101904451
A5	ENSESTT00000038812		7	101904439	101949674
A5	ENSESTT00000038799		7	101949942	101962382
A5	ENSESTT00000038800		7	101949949	101988333
A5	ENST00000314526	NM_147194	7	101950186	101950617
A5	ENST00000314157	Hs_7_c1588	7	101956102	101956916
A5	OTTHUMT00007007908	mbhnh_h_100815628	7	101956129	101956907
A5	OTTHUMT00007006547	101274767_m_			
A5	ENSESTT00000038801	19823891_2	7	101960818	101982855
A5	OTTHUMT00007007909	Hs_7_c1589	7	101988311	102009612
A5	OTTHUMT00007006171	MGC21636	7	102000041	102007712
				102014212	102174163

TABLE 3 (Continued)

A5	ENST000000313221	NM_145032	7	102014214	102230396
A5	ENST000000313196	Q8N1P0	7	102014320	102228534
A5	ENSEST00000040069		7	102113941	102146070
A5	ENST00000249377	LRRC17	7	102113983	102145927
A5	OTTHUMT00007006209	P37NB	7	102113983	102145927
A5	ENSEST00000040175		7	102127277	102174180
A5	ENSEST00000040070		7	102140423	102146070
A5	ENST000000335370	Q86UQ8	7	102174535	102177193
A5	ENSEST00000040174		7	102226175	102275821
A5	OTTHUMT00007007936	Hs_7_c1593	7	102270250	102270369
A5	ENSEST00000040076		7	102276116	102288294
A5	ENSEST00000040075		7	102276116	102299941
A5	OTTHUMT00007006404	MGC3195	7	102276139	102299655
A5	ENST000000323716	NM_031905	7	102276251	102299531
A5	ENST000000306450	Q8IZC1	7	102276251	102299531
A5	ENST000000323735	Q8IZC2	7	102276251	102299531
A5	ENSEST00000040171		7	102303502	102321207
A5	ENSEST00000040170		7	102303502	102329508
A5	ENSEST00000040173		7	102304193	102316319
A5	ENSEST00000040172		7	102304334	102320671
A5	OTTHUMT00007006927	mbhmh_h_100815628			
		101274767_m			
		19823891_2	7	102307967	102331431
A5	ENST000000292634		7	102316038	102321120
A5	OTTHUMT00007007937		7	102342330	102342917
A5	ENST000000327597	Hs_7_c1596	7	102342504	102342917
A5	ENST000000333351		7	102353043	102353323
A5	OTTHUMT00007007938		7	102353043	102353323
A5	ENSEST00000040163	Hs_7_c1597	7	102376120	102396451
A5	ENSEST00000040164		7	102376238	102386518

TABLE 3 (Continued)

A5	ENSESTT00000040161			7	102376238	102411289
A5	OTTHUMT00007007939	Hs_7_c1598		7	102376305	102481130
A5	ENST00000306389	NM_182634		7	102398168	102444053
A5	ENSESTT00000040162			7	102398194	102399966
A5	ENSESTT00000040160			7	102399052	102411365
A5	ENST00000257741	S100A11P		7	102462978	102463286
A5	OTTHUMT00007006524	S100A14		7	102462978	102463286
A5	ENSESTT00000040158			7	102478355	102481237
A5	ENST00000320297	Q8N7T0		7	102478580	102481130
A5	ENSESTT00000040082			7	102498413	102511457
A5	OTTHUMT00007006222	PMPCB		7	102498424	102513390
A5	ENST00000249269	PMPCB		7	102498438	102513249
A5	ENSESTT00000040083			7	102504818	102511457
A5	ENSESTT00000040095			7	102513072	102513736
A5	OTTHUMT00007006445	mpp11		7	102513452	102545644
A5	ENSESTT00000040149			7	102513455	102520658
A5	ENSESTT00000040147			7	102513455	102520824
A5	ENSESTT00000040145			7	102513455	102528369
A5	ENSESTT00000040141			7	102513455	102528679
A5	ENSESTT00000040142			7	102513455	102528679
A5	ENSESTT00000040133			7	102513455	102545745
A5	ENSESTT00000040134			7	102513455	102545745
A5	ENSESTT00000040135			7	102513455	102545745
A5	ENSESTT00000040136			7	102513455	102545745
A5	ENSESTT00000040129			7	102513455	102545791
A5	ENSESTT00000040130			7	102513455	102545791
A5	ENSESTT00000040151			7	102513480	102514323
A5	ENSESTT00000040150			7	102513495	102517068
A5	ENST00000249270	ZRF1		7	102513500	102545600
A5	ENST00000222539	Q9BVX1		7	102513547	102523062

TABLE 3 (Continued)

A5	ENSESTT00000040148		7	102516740	102520824
A5	ENSESTT00000040146		7	102517478	102528369
A5	ENSESTT00000040143		7	102517478	102528679
A5	ENSESTT00000040144		7	102517478	102528679
A5	ENSESTT00000040137		7	102517478	102545745
A5	ENSESTT00000040138		7	102517478	102545745
A5	ENSESTT00000040139		7	102517478	102545745
A5	ENSESTT00000040140		7	102517478	102545745
A5	ENSESTT00000040131		7	102517478	102545791
A5	ENSESTT00000040132		7	102517478	102545791
A5	ENSESTT00000040096		7	102548636	102563744
A5	ENSESTT00000040097		7	102548652	102569791
A5	ENSESTT00000040098		7	102548654	102569791
A5	OTTHUMT00007006130	PSMC2	7	102548658	102569187
A5	ENSESTT00000040100		7	102548673	102565286
A5	ENSESTT00000040099		7	102548673	102569791
A5	ENSESTT00000040101		7	102548684	102565286
A5	ENST00000292644	PSMC2	7	102548690	102569032
A5	OTTHUMT00007007711	Hs_7_c1604	7	102549579	102549746
A5	ENSESTT00000040103		7	102556671	102565286
A5	ENSESTT00000040104		7	102556671	102565286
A5	ENSESTT00000040102		7	102556671	102569791
A5	ENSESTT00000040106		7	102562512	102565286
A5	ENSESTT00000040105		7	102562512	102569791
A5	OTTHUMT00007007089		7		
		mbhmh_h_101446068			
		_102346067_m			
		_20202649_2	7	102575377	102600632
		PRES_HUMAN	7	102575377	102622492
		RELN	7	102672768	103190494
A5	ENST000000306312		7	102673292	102684682
A5	OTTHUMT00007007256				
A5	ENSESTT00000040126				





TABLE 3 (Continued)

A5	ENSESTT00000041852			7	104142399	104163317
A5	OTTHUMT00007007780	Hs_7_c1620		7	104191028	104191180
A5	ENSESTT00000041867			7	104215182	104242044
A5	ENSESTT00000041866			7	104215182	104263257
A5	ENSESTT00000041864			7	104215182	104265008
A5	ENSESTT00000041865			7	104215182	104265008
A5	ENSESTT00000041862			7	104215182	104275754
A5	ENSESTT00000041863			7	104215182	104275754
A5	ENST00000311117	MLL5		7	104215186	104314311
A5	ENSESTT00000041854			7	104215192	104242044
A5	ENSESTT00000041853			7	104215192	104263257
A5	ENSESTT00000041868			7	104215192	104275754
A5	ENSESTT00000041855			7	104215403	104275754
A5	OTTHUMT00007006515	MLL5		7	104241847	104302458
A5	ENST00000257745	O95038		7	104241931	104301566
A5	ENST00000333597	Q8IWR5		7	104241931	104314311
A5	ENSESTT00000041857			7	104264328	104303627
A5	ENSESTT00000041856			7	104264328	104307572
A5	ENST00000222422	Q9NS29		7	104264368	104291189
A5	ENSESTT00000041858			7	104267501	104275739
A5	ENSESTT00000041859			7	104278279	104291101
A5	ENST00000334914	Q86W16		7	104278380	104290339
A5	ENSESTT00000041860			7	104279822	104291098
A5	ENSESTT00000041861			7	104302560	104307572
A5	ENST00000249297	Q86W12		7	104302864	104308193
A5	ENSESTT00000041870			7	104307682	104310494
A5	ENSESTT00000041869			7	104307682	104313681
A5	OTTHUMT00007007782	Hs_7_c1623		7	104308132	104313327
A5	ENSESTT00000041872			7	104308136	104310494
A5	ENSESTT00000041871			7	104308136	104313681

TABLE 3 (Continued)

A5	ENSESTT000000041873	7	104308939	104313681
A5	ENST000000334884	7	104310018	104311845
A5	ENSESTT000000041909	7	104311672	104318457
A5	ENST000000334877	7	104312977	104314348
A5	OTTHUMT00007006319	7	104317346	104469993
A5	ENST000000257701	7	104317350	104470008
A5	ENSESTT000000041904	7	104318221	104470012
A5	ENSESTT000000041900	7	104318221	104589682
A5	ENSESTT000000041896	7	104318221	104589703
A5	ENSESTT000000041910	7	104318221	104589839
A5	ENSESTT000000041908	7	104318327	104404634
A5	ENSESTT000000041905	7	104318558	104470012
A5	ENSESTT000000041901	7	104318558	104589682
A5	ENSESTT000000041897	7	104318558	104589703
A5	ENSESTT000000041911	7	104318558	104589839
A5	ENSESTT000000041906	7	104346254	104470012
A5	ENSESTT000000041902	7	104346254	104589682
A5	ENSESTT000000041898	7	104346254	104589703
A5	ENSESTT000000041894	7	104346254	104589839
A5	ENSESTT000000041907	7	104361279	104470012
A5	ENSESTT000000041903	7	104361279	104589682
A5	ENSESTT000000041899	7	104361279	104589703
A5	ENSESTT000000041895	7	104361279	104589839
A5	OTTHUMT00007007787	7	104390180	104390804
A5	OTTHUMT00007007788	7	104405611	104405835
A5	OTTHUMT00007007791	7	104445633	104445945
A5	OTTHUMT00007007792	7	104502500	104503061
A5	OTTHUMT00007007794	7	104555221	104555496
A5	ENST000000257687	7	104657493	104709424
A5	ENSESTT000000041893	7	104658206	104660239

TABLE 3 (Continued)

A5	ENSESTT000000041892		7	104658241	104707036
A5	OTTHUMT00007006894	FLJ20485	7	104658637	104723192
A5	ENSESTT000000041890		7	104683290	104723218
A5	ENSESTT000000041891		7	104706926	104723218
A5	ENST00000320648		7	104731187	104731649
A5	ENSESTT000000041876		7	104733157	104743633
A5	ENSESTT000000041875		7	104733157	104764927
A5	ENSESTT000000041874		7	104733157	104766577
A5	ENST00000257700	NM_021930	7	104733207	104768660
A5	ENSESTT000000041877		7	104743218	104747974
A5	OTTHUMT00007006406	FLJ11785	7	104751134	104768660
A5	ENSESTT000000041887		7	104766086	104770452
A5	ENSESTT000000041888		7	104766102	104770414
A5	ENSESTT000000041886		7	104766102	104770466
A5	ENSESTT000000041889		7	104766110	104770281
A5	ENSESTT000000041885		7	104768394	104782425
A5	ENSESTT000000041884		7	104768394	104782668
A5	ENST00000327788		7	104768432	104782432
A5	ENST00000310149		7	104783163	104784060
A5	ENST00000329090		7	104783236	104784089
A5	ENST00000332220		7	104783236	104784134
A5	OTTHUMT00007007834	Hs_7_c1634	7	104783239	104784179
A5	OTTHUMT00007006590	mbhmh_h_103713457			
		_104613456_m			
		_26903715_2	7	104792229	104844029
A5	ENSESTT000000041883		7	104808623	104811530
A5	ENST00000297416	YC18_HUMAN	7	104808830	105077559
A5	ENST00000275664	Q9BTQ8	7	104814454	104825244
A5	ENSESTT000000041880		7	104815496	104893101
A5	ENSESTT000000041878		7	104816938	104818834

TABLE 3 (Continued)

A5	ENSESTT000000041881			7	104818847	104893101
A5	ENSESTT000000041882			7	104821070	104893101
A5	ENSESTT000000041879			7	104961923	105077563
A5	ENST000000318724	NM_152749		7	104962355	105077535
A5	OTTHUMT00007007007	mbhmh_nh_h _103713457 _104613456_ m_2690371 Hs_7_c1637		7	104989335	104993681
A5	OTTHUMT00007007837			7	105020472	105021075
A5	ENST000000329846			7	105020547	105021078
A5	ENSESTT000000035755			7	105076067	105077551
A5	OTTHUMT00007007841	Hs_7_c1638		7	105076766	105083558
A5	OTTHUMT00007006283	mbhmh_h_103713457 _104613456_m _26103716_2 _mbhmh_H_DJ0568B10 _F020305.fgenes.h_2.1		7	105095260	105151278
A5	OTTHUMT00007006180			7	105175823	105223819
A5	ENSESTT00000035734			7	105181971	105197312
A5	ENSESTT00000035735			7	105202525	105205801
A5	ENST000000317716	NM_152750		7	105205474	105231797
A5	ENSESTT00000035736			7	105205482	105221463
A5	OTTHUMT00007006497	mbhmh_nh_h_103713457 _104613456_m_2690371		7	105224488	105232430
A5	ENSESTT00000035737			7	105229534	105234760
A5	OTTHUMT00007006260	SYPL		7	105291482	105313528
A5	ENST00000011473	SYPL		7	105291489	105313588
A5	ENSESTT00000035754			7	105292251	105294130
A5	ENSESTT00000035753			7	105292251	105298877
A5	ENSESTT00000035750			7	105292251	105313289
A5	ENSESTT00000035752			7	105292673	105300262

TABLE 3 (Continued)

A5	ENSESTT00000035751				105300133	105313289
A5	OTTHUMT00007007872		Hs_7_c1643	7	105326309	105327674
A5	OTTHUMT00007006155		PBEF	7	105451187	105485888
A5	ENSESTT00000035747			7	105451529	105470301
A5	ENSESTT00000035746			7	105451529	105471257
A5	ENSESTT00000035745			7	105451529	105476028
A5	ENSESTT00000035740			7	105451529	105486169
A5	ENSESTT00000035741			7	105451529	105486169
A5	ENSESTT00000035738			7	105451529	105486589
A5	ENSESTT00000035749			7	105452034	105454595
A5	ENST00000222553		PBEF_HUMAN	7	105452060	105485898
A5	ENSESTT00000035748			7	105462192	105464474
A5	ENSESTT00000035744			7	105469472	105485522
A5	ENSESTT00000035742			7	105473329	105486169
A5	ENSESTT00000035743			7	105473329	105486169
A5	ENSESTT00000035739			7	105473329	105486589
A5	OTTHUMT00007007874		Hs_7_c1646	7	105516202	105516577
A5	OTTHUMT00007007875		Hs_7_c1647	7	105831822	105832343
A5	OTTHUMT00007007586		Hs_7_c3104	7	105832534	105833055
A5	OTTHUMT00007006262		mbxx_nh_chr7 .105.006.a			
A5	ENST00000315965		NM_175884	7	105833369	105833704
A5	OTTHUMT00007007876		Hs_7_c1648	7	105861166	105861861
A6	ENSESTT00000021279			10	105861484	105861765
A6	ENST00000311182		CBARA1	10	73471701	73512400
A6	ENSESTT00000021278			10	73471701	73730468
A6	ENSESTT00000021277			10	73472141	73579660
A6	ENSESTT00000021276			10	73581559	73730469
A6	ENSESTT00000021271			10	73637423	73730476
A6	ENSESTT00000021271			10	73668375	73670920
A6	ENST000000313314		NM_138357	10	73796492	73992053

TABLE 3 (Continued)

A6	ENST000000286508	Q96FL3	10	73796537	73990183
A6	ENSESTT00000021273		10	73797084	73988744
A6	ENSESTT00000021272		10	73797084	73992055
A6	ENSESTT00000021275		10	73964348	73988744
A6	ENSESTT00000021274		10	73964348	73992055
A6	ENST000000260885	NM_152635	10	73997942	74037390
A6	ENST000000334011	Q8WWZ8	10	73998160	74036885
A6	ENSESTT00000021456		10	74016118	74028872
A6	ENSESTT00000021457		10	74034940	74046965
A6	ENSESTT00000021528		10	74039868	74058975
A6	ENST000000260878	PLA2G13	10	74039978	74059139
A6	ENST000000332968		10	74110192	74110956
A6	ENST000000263556	P4HA1	10	74112583	74179244
A6	ENST000000307116	P4HA1	10	74112583	74179244
A6	ENSESTT00000021526		10	74118611	74155608
A6	ENSESTT00000021527		10	74121207	74155454
A6	ENSESTT00000021525		10	74157783	74201227
A6	ENST000000299408	NUDT13	10	74214816	74236183
A6	ENSESTT00000021458		10	74214883	74236720
A6	ENST000000335635	Q9Y3X2	10	74226553	74235264
A6	ENST000000325946	NUDT13	10	74229464	74229628
A6	ENST000000263565	SGT1_HUMAN	10	74238886	74272420
A6	ENSESTT00000021521		10	74243730	74272456
A6	ENSESTT00000021522		10	74258724	74272456
A6	ENSESTT00000021524		10	74260633	74272402
A6	ENSESTT00000021523		10	74260633	74272456
A6	ENST000000242505	Q9Y2I0	10	74279052	74346541
A6	ENSESTT00000021459		10	74332501	74340393
A6	ENSESTT00000021460		10	74332502	74345507
A6	ENSESTT00000021461		10	74334657	74340393

TABLE 3 (Continued)

A6	ENSESTT00000021463		10	74338355	74338793
A6	ENSESTT00000021462		10	74339356	74345515
A6	ENST00000299416	DNAJC9	10	74347761	74351550
A6	ENST00000299418	MRPS16	10	74353204	74357012
A6	ENSESTT00000021464		10	74353210	74355109
A6	ENSESTT00000021465		10	74357530	74358710
A6	ENSESTT00000021466		10	74357561	74358710
A6	ENSESTT00000021520		10	74358121	74379898
A6	ENST00000310715	NM_145170	10	74358127	74463115
A6	ENST00000286530	Q8N7D5	10	74358336	74397767
A6	ENST00000277916	ANXA7	10	74479811	74518414
A6	ENST00000260852	ANXA7	10	74480456	74505217
A6	ENSESTT00000021505		10	74484518	74518436
A6	ENSESTT00000021506		10	74484518	74518436
A6	ENSESTT00000021507		10	74484518	74518436
A6	ENSESTT00000021467		10	74485833	74487824
A6	ENSESTT00000021517		10	74487551	74518431
A6	ENSESTT00000021508		10	74487551	74518436
A6	ENSESTT00000021509		10	74487551	74518436
A6	ENSESTT00000021518		10	74487935	74518431
A6	ENSESTT00000021510		10	74487935	74518436
A6	ENSESTT00000021511		10	74487935	74518436
A6	ENSESTT00000021512		10	74487935	74518436
A6	ENSESTT00000021513		10	74487935	74518436
A6	ENSESTT00000021514		10	74487935	74518436
A6	ENSESTT00000021519		10	74487963	74518419
A6	ENSESTT00000021515		10	74487976	74518436
A6	ENSESTT00000021516		10	74492701	74518436
A6	ENST00000299432	ZMYND17	10	74528914	74537973
A6	ENST00000265920	PPP3CB	10	74541167	74600362



TABLE 3 (Continued)

A6	ENSESTT00000021500	10	74542284	74575867
A6	ENSESTT00000021501	10	74542284	74575867
A6	ENSESTT00000021502	10	74542546	74575867
A6	ENSESTT00000021504	10	74542559	74571979
A6	ENST00000320361	10	74542603	74600250
A6	ENSESTT00000021503	10	74548717	74575867
A6	ENSESTT00000021499	10	74579279	74600362
A6	ENSESTT00000021468	10	74600104	74601061
A6	ENST00000319786	10	74601901	74621672
A6	ENSESTT00000021469	10	74634518	74635149
A6	ENST00000318330	10	74736016	74746118
A6	ENST00000332382	10	74736345	74742281
A6	ENST00000299404	10	74749893	74755390
A6	ENST00000310381	10	74778960	74802116
A6	ENSESTT00000021498	10	74787103	74799146
A6	ENSESTT00000021470	10	74834923	74835765
A6	ENST00000333366	10	74836264	74838018
A6	ENST00000332341	10	74836264	74838018
A6	ENSESTT00000021472	10	74848734	74869952
A6	ENSESTT00000021471	10	74848734	74875148
A6	ENSESTT00000021473	10	74848778	74856191
A6	ENST00000313749	10	74851194	74875548
A6	ENSESTT00000021474	10	74870160	74875148
A6	ENSESTT00000021475	10	74872779	74875148
A6	ENSESTT00000021476	10	74873363	74874530
A6	ENST00000326248	10	74876477	74880577
A6	ENST00000299593	10	74876947	74877339
A6	ENSESTT00000021478	10	74877622	74880515
A6	ENSESTT00000021477	10	74877622	74883436
A6	ENSESTT00000021479	10	74886411	74888015

TABLE 3 (Continued)

A6	ENST000000310182	Q96BP2	10	74886424	74887727
A6	ENSETT00000021480		10	74886683	74888015
A6	ENST000000326185	Q8NB34	10	74890240	74890617
A6	ENSETT00000021481		10	74893032	74894348
A6	ENSETT00000021482		10	74893456	74894353
A6	ENSETT00000021483		10	74893863	74894617
A6	ENST000000242558	094987	10	74894547	74903962
A6	ENSETT00000021484		10	74895484	74896595
A6	ENSETT00000021485		10	74897161	74898597
A6	ENST000000310153	Q9H8F3	10	74897187	74906153
A6	ENSETT00000021486		10	74900732	74903751
A6	ENSETT00000021487		10	74900875	74903751
A6	ENSETT00000021488		10	74904375	74906153
A6	ENST000000325890	Q8N420	10	74904393	74905880
A6	ENSETT00000021489		10	74905268	74906153
A6	ENST000000299641	NDST2	10	74906812	74913092
A6	ENST000000309979	Q8WV68	10	74915239	74916144
A6	ENST000000309967		10	74916017	74916304
A6	ENST000000322680	CAMK2G	10	74916862	74978941
A6	ENST000000305762	Q8NIA4	10	74919376	74977443
A6	ENST000000322635	NM_172169	10	74919376	74978822
A6	ENST000000277853	NM_001222	10	74919376	74978822
A6	ENSETT00000021493		10	74919386	74978883
A6	ENSETT00000021490		10	74919386	74978935
A6	ENSETT00000021497		10	74919578	74951712
A6	ENSETT00000021495		10	74921388	74978836
A6	ENSETT00000021494		10	74921388	74978883
A6	ENSETT00000021491		10	74921388	74978935
A6	ENSETT00000021496		10	74921432	74952651
A6	ENSETT00000021492		10	74953412	74978891

TABLE 3 (Continued)

A6	ENSESTT00000021181	10	75013538	75019592
A6	ENSESTT00000021180	10	75013538	75019765
A6	ENSESTT00000021179	10	75013538	75021858
A6	ENST00000317358	10	75014337	75016591
A6	ENSESTT00000021174	10	75015493	75019592
A6	ENSESTT00000021183	10	75015493	75019765
A6	ENSESTT00000021182	10	75015493	75021858
A6	ENST00000242464	10	75015909	75020926
A6	ENSESTT00000021176	10	75016395	75019765
A6	ENSESTT00000021175	10	75016395	75021858
A6	ENSESTT00000021178	10	75017648	75019765
A6	ENSESTT00000021177	10	75017648	75021858
A6	ENSESTT00000021185	10	75102475	75175189
A6	ENSESTT00000021184	10	75102475	75177160
A6	ENSESTT00000021186	10	75102477	75168197
A6	ENST00000277829	10	75102569	75222530
A6	ENST00000211998	10	75102569	75224513
A6	ENSESTT00000021187	10	75147443	75177116
A6	ENSESTT00000021189	10	75179224	75219023
A6	ENSESTT00000021188	10	75179224	75223339
A6	ENSESTT00000021209	10	75200527	75206788
A6	ENSESTT00000021191	10	75201559	75219023
A6	ENSESTT00000021190	10	75201559	75223339
A6	ENSESTT00000021192	10	75218050	75223339
A6	ENSESTT00000021193	10	75219116	75222883
A6	ENSESTT00000021208	10	75222927	75224394
A6	ENST00000330581	10	75226134	75255181
A6	ENSESTT00000021206	10	75227787	75255426
A6	ENST00000323546	10	75229527	75229598
A6	ENSESTT00000021207	10	75233235	75234365

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TABLE 3 (Continued)

A6	ENSESTT00000021195		10	75255568	75632868
A6	ENSESTT00000021194		10	75255568	75813656
A6	ENSESTT00000021196		10	75255596	75328956
A6	ENST00000286621	ADK	10	75255640	75812806
A6	ENSESTT00000021199		10	75280904	75632868
A6	ENSESTT00000021198		10	75280904	75704867
A6	ENSESTT00000021197		10	75280904	75813656
A6	ENST00000330453		10	75527848	75528380
A6	ENST00000326278		10	75631945	75632449
A6	ENSESTT00000021205		10	75903848	75958752
A6	ENSESTT00000021201		10	75929925	75947950
A6	ENSESTT00000021200		10	75929925	76076904
A6	ENST00000287239	MYST4	10	75930980	76135407
A6	ENSESTT00000021203		10	75930982	75947950
A6	ENSESTT00000021202		10	75930982	76076904
A6	ENSESTT00000021204		10	75931001	75947270
A6	ENSESTT00000021123		10	76083627	76086278
A6	ENSESTT00000021143		10	76124157	76126508
A6	ENSESTT00000021142		10	76198793	76199990
A6	ENST00000308475		10	76198802	76213537
A6	ENSESTT00000021141		10	76198943	76200127
A6	ENSESTT00000021139		10	76202071	76213531
A6	ENSESTT00000021140		10	76208362	76213559
A6	ENST00000330673	Q96J67	10	76210030	76213518
A6	ENSESTT00000021124		10	76215992	76255437
A6	ENSESTT00000021138		10	76228974	76230298
A6	ENST00000287258	NM_144660	10	76254890	76280615
A6	ENSESTT00000021125		10	76280444	76281496
A6	ENSESTT00000021127		10	76314523	76322599
A6	ENSESTT00000021126		10	76314523	76335808

TABLE 3 (Continued)

A6	ENST000000298468	VDAC2	10	76315209	76335638
A6	ENSESTT00000021128		10	76315395	76335808
A6	ENST000000304595	VDAC2	10	76315945	76335465
A6	ENSESTT000000021129		10	76333671	76335638
A6	ENSESTT000000021136		10	76338330	76339540
A6	ENSESTT000000021137		10	76338332	76339540
A6	ENSESTT000000021135		10	76338332	76339908
A6	ENST000000298482	NM_144589	10	76338434	76340289
A6	ENSESTT000000021134		10	76340085	76340318
A6	ENST000000308111	NM_032772	10	76502522	76506032
A6	ENSESTT000000021133		10	76504121	76505779
A6	ENSESTT000000021130		10	76505464	76511780
A6	ENST000000321905		10	76507413	76512179
A6	ENSESTT000000021131		10	76508372	76511814
A6	ENST000000260908	Q9P1K6	10	76683657	76683884
A6	ENSESTT000000021132		10	76875127	77140490
A6	ENST000000277847	NM_032024	10	77140367	77163144
A6	ENSESTT000000021106		10	77387031	77389445
A6	ENSESTT000000021100		10	77428760	77661738
A6	ENSESTT000000021101		10	77463793	77661593
A6	ENSESTT000000021098		10	77507582	77661714
A6	ENSESTT000000021099		10	77569175	77661701
A6	ENSESTT000000021105		10	77981962	77992271
A6	ENST000000331566		10	77982100	77982255
A6	ENST000000286628	KCNMA1	10	77991627	78214698
A6	ENSESTT000000021104		10	77991650	78019414
A6	ENSESTT000000021102		10	77992403	78006633
A6	ENSESTT000000021103		10	77992437	78082885
A6	ENSESTT000000021145		10	78009186	78053824
A6	ENSESTT000000021172		10	78014424	78053629

TABLE 3 (Continued)

A6	ENSESTT000000021173	10	78018433	78049275
A6	ENSESTT000000021171	10	78053673	78116388
A6	ENSESTT000000021170	10	78078354	78123424
A6	ENSESTT000000021168	10	78099639	78143996
A6	ENSESTT000000021169	10	78116559	78143977
A6	ENSESTT000000021167	10	78177554	78212924
A6	ENSESTT000000021166	10	78189055	78287832
A6	ENSESTT000000021146	10	78204890	78205770
A6	ENSESTT000000021147	10	78252653	78254461
A6	ENSESTT000000021162	10	78287850	78742046
A6	ENSESTT000000021165	10	78686459	78723017
A6	ENSESTT000000021163	10	78740556	78741848
A6	ENSESTT000000021164	10	78740566	78741829
A6	ENST000000334073	10	78836952	78838490
A6	ENST000000320599	10	78884695	78886237
A6	ENST000000320511	10	78895154	78961260
A6	ENSESTT000000021157	10	78896519	78910150
A6	ENSESTT000000021161	10	78896672	78898481
A6	ENSESTT000000021158	10	78896672	78910150
A6	ENSESTT000000021159	10	78898010	78910150
A6	ENSESTT000000021160	10	78899194	78910150
A6	ENSESTT000000021155	10	78911119	78913967
A6	ENSESTT000000021156	10	78911160	78912313
A6	ENSESTT000000021154	10	78915532	78916696
A6	ENSESTT000000021153	10	78920387	78923893
A6	ENSESTT000000021151	10	78925896	78935239
A6	ENSESTT000000021152	10	78925896	78935239
A6	ENSESTT000000021149	10	78925896	78946262
A6	ENSESTT000000021150	10	78925896	78946262
A6	ENSESTT000000021148	10	78948038	78958638

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A6	ENST000000318641	10	79032042	79032499
A6	ENST00000277783	10	79080509	79133862
A6	ENSESTT00000021121	10	79081352	79090348
A6	ENSESTT00000021122	10	79086568	79089703
A6	ENSESTT00000021120	10	79104456	79128979
A6	ENSESTT00000021112	10	79138153	79141824
A6	ENSESTT00000021111	10	79138153	79141833
A6	ENSESTT00000021110	10	79138153	79144586
A6	ENSESTT00000021109	10	79138153	79145062
A6	ENSESTT00000021108	10	79138153	79153449
A6	ENST00000260896	10	79138226	79145063
A6	ENSESTT00000021114	10	79139712	79145062
A6	ENSESTT00000021113	10	79139712	79159037
A6	ENST00000311407	10	79193716	79194732
A6	ENSESTT00000021115	10	79353170	79457696
A6	ENSESTT00000021116	10	79371686	79382425
A6	ENSESTT00000021117	10	79371802	79434851
A6	ENSESTT00000021118	10	79398200	79405363
A6	ENSESTT00000021119	10	79800422	79801382
A6	ENSESTT00000021253	10	80160384	80173420
A6	ENSESTT00000021230	10	80244085	80395502
A6	ENST00000334512	10	80244414	80417109
A6	ENSESTT00000021231	10	80348029	80395502
A6	ENST00000277788	10	80348029	80417109
A6	ENSESTT00000021232	10	80410611	80417213
A6	ENSESTT00000021233	10	80451828	80458345
A6	ENST00000225174	10	80451837	80459684
A6	ENSESTT00000021234	10	80486687	80513633
A6	ENST00000298180	10	80486688	80549986
A6	ENSESTT00000021252	10	80498696	80549886

TABLE 3 (Continued)

A6	ENSESTT000000021251				
A6	ENST000000329262		10	80608432	80610640
A6	ENST000000328784	SFTPA2	10	80617009	80617473
A6	ENSESTT000000021246		10	80661568	80663842
A6	ENSESTT000000021247		10	80661840	80664756
A6	ENSESTT000000021248		10	80661841	80664756
A6	ENSESTT000000021248		10	80661863	80664744
A6	ENSESTT000000021245		10	80663244	80984138
A6	ENST000000334432	SFTPA1	10	80715314	80718472
A6	ENST000000329658		10	80716284	80718472
A6	ENSESTT000000021235		10	80718201	81039562
A6	ENSESTT000000021237		10	80718531	81039746
A6	ENSESTT000000021238		10	80718764	81039731
A6	ENSESTT000000021241		10	80718926	80719667
A6	ENSESTT000000021239		10	80719112	81039731
A6	ENSESTT000000021240		10	80719228	81039731
A6	ENSESTT000000021236		10	80772270	81190839
A6	ENSESTT000000021250		10	80789921	80795955
A6	ENST000000241878	Q9H392	10	80852848	80853054
A6	ENSESTT000000021249		10	80928323	80930532
A6	ENST000000333539		10	80936971	80937273
A6	ENST000000242457	SFTPA2	10	80981513	80983787
A6	ENSESTT000000021242		10	80981785	80984701
A6	ENSESTT000000021243		10	80981786	80984701
A6	ENSESTT000000021244		10	80981808	80984689
A6	ENSESTT000000021401		10	81035257	81038146
A6	ENST000000242455	SFTPA1	10	81035260	81038418
A6	ENSESTT000000021402		10	81035266	81038139
A6	ENSESTT000000021403		10	81035780	81036737
A6	ENSESTT000000021455		10	81038872	81039613
A6	ENSESTT000000021404		10	81093936	81101184



TABLE 3 (Continued)

A6	ENSESTT00000021454	10	81110118	81116151
A6	ENSESTT00000021446	10	81116552	81250849
A6	ENST000000335456	10	811128338	81275386
A6	ENST000000334434	10	811173024	81173230
A6	ENSESTT00000021451	10	81190668	81230459
A6	ENSESTT00000021447	10	81190746	81250724
A6	ENSESTT00000021453	10	81202274	81202689
A6	ENSESTT00000021448	10	812226317	81250724
A6	ENSESTT00000021450	10	81228390	81238987
A6	ENSESTT00000021452	10	81228392	81230459
A6	ENSESTT00000021449	10	81228392	81250724
A6	ENST000000305740	10	81268629	81274246
A6	ENST000000298189	10	81268792	81275205
A6	ENSESTT00000021445	10	81294428	81295438
A6	ENSESTT00000021405	10	81329237	81332141
A6	ENST000000312535	10	81344660	81347359
A6	ENSESTT00000021406	10	81346244	81347451
A6	ENSESTT00000021444	10	81362073	81373418
A6	ENSESTT00000021443	10	81362073	81373430
A6	ENST000000256035	10	81362085	81373438
A6	ENST000000302577	10	81456301	81456726
A6	ENSESTT00000021407	10	81503006	81516880
A6	ENSESTT00000021408	10	81503009	81516880
A6	ENST000000256052	10	81503033	81516880
A6	ENSESTT00000021409	10	81503580	81516880
A6	ENSESTT00000021410	10	81506036	81510774
A6	ENSESTT00000021411	10	81506170	81515572
A6	ENSESTT00000021412	10	81506477	81516880
A6	ENSESTT00000021442	10	81515319	81516192
A6	ENSESTT00000021413	10	81557063	81569687

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TABLE 3 (Continued)

A6	ENSESTT00000021414	10	81566481	81568673
A6	ENSESTT00000021415	10	81568379	81569370
A6	ENSESTT00000021416	10	81579472	81582085
A6	ENSESTT00000021426	10	81579821	81582361
A6	ENSESTT00000021430	10	81579821	81583460
A6	ENSESTT00000021429	10	81579821	81587747
A6	ENSESTT00000021427	10	81579932	81590496
A6	ENST00000026547	10	81580186	81597194
A6	ENSESTT00000021428	10	81583422	81587941
A6	ENSESTT00000021440	10	81591229	81629900
A6	ENSESTT00000021441	10	81593529	81597204
A6	ENST000000316258	10	81671552	81672016
A6	ENST000000280867	10	81696158	81713756
A6	ENSESTT00000021439	10	81697070	81697478
A6	ENSESTT00000021438	10	81697983	81699025
A6	ENSESTT00000021437	10	81700853	81713692
A6	ENSESTT00000021435	10	81700889	81714017
A6	ENSESTT00000021436	10	81705012	81714017
A6	ENSESTT00000021433	10	81760462	81781086
A6	ENST000000302526	10	81762785	81776934
A6	ENSESTT00000021434	10	81762846	81781047
A6	ENSESTT00000021417	10	81781106	81787306
A6	ENST000000316132	10	81781135	81792406
A6	ENSESTT00000021418	10	81787282	81791494
A6	ENSESTT00000021419	10	81832162	81856971
A6	ENSESTT00000021420	10	81832829	81856971
A6	ENSESTT00000021421	10	81832918	81856971
A6	ENSESTT00000021422	10	81838176	81856971
A6	ENST000000241895	10	81838189	81856968
A6	ENST000000312169	10	81913567	81942309
ANXA11				
MAT1A				
NM_138812				
NM_032372				
NM_032333				
Q9BU34				

TABLE 3 (Continued)

A6	ENST000000316064	Q8N2P5	10	81913567	81945181
A6	ENST00000265450	NM_030927	10	81913567	81946237
A6	ENSESTT00000021423		10	81913573	81947518
A6	ENSESTT00000021432		10	81939416	81943437
A6	ENSESTT00000021424		10	81940535	81942599
A6	ENSESTT00000021425		10	81940630	81956185
A6	ENSESTT00000021431		10	81953930	81960275
A6	ENST00000329171		10	81959343	81959717
A6	ENST00000313455	Q8NB58	10	82067342	82068641
A6	ENSESTT00000021107		10	82074130	82078067
A7	OTTHUMT00007008148	Hs_7_c5082	7	71452603	71709685
A7	ENSESTT00000039973		7	71571787	71621457
A7	OTTHUMT00007007334	Hs_7_c1064	7	71599963	71600172
A7	ENST00000265301		7	71605907	71606016
A7	OTTHUMT00007007336	Hs_7_c1066	7	71645929	71646324
A7	ENSESTT00000039972		7	71654577	71698179
A7	ENSESTT00000039971		7	71689895	71710894
A7	ENSESTT00000039970		7	71709544	71710900
A7	ENSESTT00000039903		7	71712159	71716707
A7	ENSESTT00000039904		7	71712178	71714460
A7	OTTHUMT00007006933	LOC155370	7	71712203	71716703
A7	ENSESTT00000039905		7	71712367	71716710
A7	OTTHUMT00007007337	Hs_7_c1068	7	71746587	71753122
A7	ENSESTT00000039948		7	71746639	71904642
A7	OTTHUMT00007007338	Hs_7_c1069	7	71747922	71748002
A7	ENST00000323915		7	71749050	71751686
A7	ENSESTT00000039906		7	71762023	71773321
A7	ENSESTT00000039911		7	71762045	71763010
A7	ENSESTT00000039910		7	71762045	71822067
A7	ENSESTT00000039909		7	71762045	71822522

TABLE 3 (Continued)

A7	ENSESTT000000039908	7	71762045	72120515
A7	ENSESTT00000039907	7	71762045	72121873
A7	OTTHUMT00007006851	7	71762053	71834096
A7	ENST00000275580	7	71762053	71922346
A7	ENSESTT00000039912	7	71773689	71796697
A7	ENST00000257622	7	71809068	71828890
A7	ENSESTT00000039913	7	71823101	72121996
A7	ENSESTT00000039914	7	71823135	71830954
A7	ENSESTT00000039938	7	71830947	71831469
A7	ENSESTT00000039937	7	71830947	71831838
A7	ENSESTT00000039935	7	71830947	71831880
A7	ENSESTT00000039933	7	71830947	71831893
A7	ENSESTT00000039931	7	71830947	71833202
A7	ENSESTT00000039929	7	71830947	71837351
A7	ENSESTT00000039926	7	71830947	71837371
A7	ENSESTT00000039925	7	71830947	71837390
A7	ENSESTT00000039936	7	71830954	71831875
A7	ENSESTT00000039934	7	71830954	71831893
A7	ENSESTT00000039932	7	71830954	71833202
A7	ENSESTT00000039930	7	71830954	71837351
A7	ENSESTT00000039927	7	71830954	71837371
A7	OTTHUMT00007007028	7	71830955	71837376
A7	ENST00000330999	7	71831040	71832800
A7	ENST00000222857	7	71831040	71834307
A7	ENSESTT00000039923	7	71831952	72131287
A7	ENSESTT00000039928	7	71832127	71837371
A7	ENSESTT00000039924	7	71836013	71837392
A7	ENST00000285805	7	71842133	71852114
A7	ENSESTT00000039939	7	71842201	71849602
A7	OTTHUMT00007006839		mfmh_h_70400969	

TABLE 3 (Continued)

A7	ENSESTT00000039940	71300968_m	7	71842530	71848805
A7	ENSESTT00000039915	_I33605736_13	7	71848707	72154649
A7	ENST000000335315		7	71851502	71854934
A7	OTTHUMT00007007357	Q8N4N6	7	71852127	71852366
A7	OTTHUMT00007007220	Hs 7_c1076	7	71852462	71854375
A7	ENST000000305954	DKEZP434A0131.3	7	71857195	71882155
A7	ENSESTT00000039969	NM_018991	7	71857213	71882155
A7	ENSESTT00000039916		7	71876851	71877435
A7	ENSESTT00000039962		7	71877080	72107101
A7	ENSESTT00000039963		7	71880796	71888562
A7	ENSESTT00000039949		7	71880796	71888562
A7	ENSESTT00000039950		7	71880796	71888584
A7	ENSESTT00000039964		7	71881128	71888584
A7	ENSESTT00000039965		7	71881128	71888562
A7	ENSESTT00000039951		7	71881128	71888584
A7	ENSESTT00000039952		7	71881128	71888584
A7	ENSESTT00000039953		7	71881128	71888584
A7	ENSESTT00000039966		7	71881144	71888562
A7	ENSESTT00000039954		7	71881144	71888584
A7	ENSESTT00000039955		7	71881144	71888584
A7	ENSESTT00000039956		7	71881144	71888584
A7	ENSESTT00000039957		7	71881144	71888584
A7	ENSESTT00000039967		7	71881902	71888562
A7	ENSESTT00000039958		7	71881902	71888584
A7	ENSESTT00000039959		7	71881902	71888584
A7	ENSESTT00000039960		7	71882400	71888584
A7	ENSESTT00000039961		7	71882400	71888584
A7	ENSESTT00000039968		7	71882996	71888562

TABLE 3 (Continued)

A7	OTTHUMT00007007358	Hs_7_c1079	7	71888246	71931788
A7	ENSESTT00000039917		7	71888736	71922142
A7	ENSESTT00000039918		7	71888768	71932926
A7	ENSESTT00000039920		7	71888780	71904881
A7	ENSESTT00000039919		7	71888780	71932926
A7	OTTHUMT00007006363	mbhmh_gw1304124			
		.71119255.71153128			
		.3.2e-3	7	71892093	71895794
		Q86WY7	7	71894107	71932926
A7	ENSESTT00000039921		7	71902561	71908486
A7	ENST00000334824		7	71903628	71905036
A7	ENSESTT00000039944		7	71904798	71932687
A7	ENSESTT00000039943		7	71908198	71909384
A7	ENSESTT00000039947		7	71910560	71912409
A7	ENSESTT00000039946		7	71918103	71919942
A7	ENSESTT00000039945		7	71920032	71931791
A7	ENST00000323689	PMS2L5	7	71922114	71931791
A7	ENST00000306533	Q86WY7	7	71930603	71936531
A7	ENST00000335506		7	71931673	71933081
A7	ENSESTT00000039942		7		
A7	OTTHUMT00007006797	mfhmh_H_NH0396K03			
		_F218045.fgenes2.5	7	71931784	71940793
			7	71936243	71937429
			7	71981407	72009414
		Hs_7_c1083	7	72001548	72031575
			7	72001575	72012822
			7	72016228	72028278
			7	72016228	72031964
			7	72016228	72032675
			7	72016228	72032723
			7	72016228	72032724
A7	ENSESTT00000039941				
A7	ENSESTT00000039922				
A7	OTTHUMT00007007381				
A7	ENSESTT00000041207				
A7	ENSESTT00000041210				
A7	ENSESTT00000041209				
A7	ENSESTT00000041208				
A7	ENSESTT00000041225				
A7	ENSESTT00000041224				

TABLE 3 (Continued)

A7	ENSESTT00000041215	7	72017507	72028278
A7	ENSESTT00000041214	7	72017507	72031964
A7	ENSESTT00000041213	7	72017507	72032675
A7	ENSESTT00000041212	7	72017507	72032723
A7	ENSESTT00000041211	7	72017507	72032724
A7	ENSESTT00000041220	7	72018632	72028278
A7	ENSESTT00000041219	7	72018632	72031964
A7	ENSESTT00000041218	7	72018632	72032675
A7	ENSESTT00000041217	7	72018632	72032723
A7	ENSESTT00000041216	7	72018632	72032724
A7	ENSESTT00000041221	7	72020761	72028278
A7	ENSESTT00000041222	7	72028242	72032724
A7	ENSESTT00000041223	7	72029512	72032724
A7	ENSESTT00000041228	7	72046727	72056376
A7	ENSESTT00000041226	7	72046727	72062034
A7	ENSESTT00000041227	7	72046727	72062034
A7	OTTHUMT00007006731	7	72046768	72062076
A7	ENSESTT00000041229	7	72046771	72056068
A7	ENST00000330925	7	72046778	72061921
A7	ENSESTT00000041230	7	72057999	72062076
A7	ENSESTT00000041231	7	72058029	72062076
A7	ENST00000297906	7	72069401	72070888
A7	ENSESTT00000041281	7	72077500	72079722
A7	OTTHUMT00007008151	7	72085452	72106243
A7	OTTHUMT00007006556			
A7	ENST00000308082	7	72111678	72127258
A7	OTTHUMT00007007030	7	72119594	72129318
A7	ENST00000310326	7	72129323	72134901
		7	72129324	72134920

NCF1.1

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\_72100967\_m  
\_133605736\_13  
WBSCR20A.2  
WBSCR20A

TABLE 3 (Continued)

A7	ENSESTT00000041279		7	72129920	72134917
A7	ENSESTT00000041278		7	72130393	72133598
A7	ENSESTT00000041280		7	72130841	72134862
A7	ENST00000333149	NM_178125	7	72138632	72154182
A7	OTTHUMT00007007384	Hs_7_c1089	7	72139056	72150837
A7	ENSESTT00000041277		7	72139434	72143038
A7	ENSESTT00000041276		7	72139434	72144953
A7	ENSESTT00000041275		7	72139434	72151653
A7	OTTHUMT00007007413	Hs_7_c1090	7	72140207	72141310
A7	ENST00000252037	FKBP6	7	72154529	72168994
A7	OTTHUMT00007006557	mbhmh_h_71200968			
		_72100967_m			
		_133605736_13			
A7	ENSESTT00000041233		7	72154529	72168994
A7	ENSESTT00000041232		7	72156394	72184728
A7	ENSESTT00000041234		7	72156394	72184733
A7	OTTHUMT00007006375		7	72157790	72168998
A7	ENST00000265756	FZD9	7	72260410	72262589
A7	OTTHUMT00007007171	BAZ1B	7	72266830	72348646
A7	ENSESTT00000041274	BAZ1B	7	72266830	72348712
A7	ENSESTT00000041273		7	72268726	72273720
A7	ENSESTT00000041272		7	72277272	72303421
A7	ENSESTT00000041271		7	72304601	72348524
A7	ENSESTT00000041266		7	72304601	72348733
A7	ENST00000223368		7	72362783	72383988
A7	OTTHUMT00007006736	BCL7B	7	72362783	72384121
A7	ENSESTT00000041269	BCL7B	7	72362783	72384121
A7	ENSESTT00000041264		7	72363456	72383648
A7	ENSESTT00000041263		7	72363456	72384093
A7	ENSESTT00000041267		7	72363469	72384120
			7	72363476	72383988



TABLE 3 (Continued)

A7	ENSESTT00000041270		7	72363528	72383646
A7	ENSESTT00000041268		7	72363620	72383668
A7	ENSESTT00000041265		7	72363620	72384016
A7	ENSESTT00000041262		7	72363722	72384156
A7	OTTHUMT00007006751	TBL2	7	72396096	72405069
A7	ENST00000275621	TBL2	7	72396099	72405018
A7	ENSESTT00000041260		7	72396857	72405034
A7	ENSESTT00000041261		7	72396857	72405034
A7	ENST00000305632	NM_032988	7	72403031	72404976
A7	ENST00000243720	WBSR14	7	72419621	72450967
A7	OTTHUMT00007006613	WBSR14	7	72419621	72450967
A7	ENSESTT00000041259		7	72420796	72422929
A7	ENST00000313375	WBSR14	7	72422850	72450919
A7	ENSESTT00000041257		7	72424072	72450970
A7	ENSESTT00000041258		7	72433738	72450946
A7	OTTHUMT00007007252	mbhmh_h_71200968			
		72100967_m	7	72478242	72507686
		133605736_13	7	72494272	72497803
		WBSR24	7	72494282	72497608
A7	ENST00000324941		7	72508698	72509869
A7	ENSESTT00000041235	WBSR18	7	72509170	72509850
A7	OTTHUMT00007006614	WBSR18	7	72510028	72524583
A7	ENST00000324842		7	72510034	72524313
A7	ENSESTT00000041236		7	72510034	72524639
A7	ENST00000265758	WBSR22	7	72510055	72524583
A7	OTTHUMT00007006630	WBSR22	7	72510072	72524583
A7	ENSESTT00000041237		7	72510232	72519061
A7	ENSESTT00000041238		7	72517339	72524579
A7	ENSESTT00000041239		7	72519822	72524424
A7	ENSESTT00000041240				
A7	ENSESTT00000041241				



TABLE 3 (Continued)

A7	ENST000000320399	Q8N2G0	7	72854615	72896103
A7	ENST000000252034	O15337	7	72861793	72887565
A7	ENSESTT00000041245		7	72879278	72882774
A7	ENSESTT00000041246		7	72883099	72889621
A7	ENSESTT00000041247		7	72892119	72895391
A7	ENST000000265761	LIMK1	7	72910253	72948951
A7	OTTHUMT00007006772	LIMK1	7	72910253	72948951
A7	ENSESTT00000041248		7	72919602	72925577
A7	ENSESTT00000041249		7	72932555	72947826
A7	ENSESTT00000041250		7	72938074	72947826
A7	ENSESTT00000036020		7	73000780	73021942
A7	ENSESTT00000036019		7	73000780	73023522
A7	ENSESTT00000036021		7	73000783	73016740
A7	ENSESTT00000036016		7	73000792	73021897
A7	ENSESTT00000036017		7	73000792	73021897
A7	ENST000000265754	WBSCR1	7	73000803	73023526
A7	OTTHUMT00007006349	WBSCR1	7	73000803	73023526
A7	ENST000000265753	WBSCR1	7	73000811	73021735
A7	ENSESTT00000036018		7	73000834	73023522
A7	ENSESTT00000036027		7	73036361	73046683
A7	ENST000000309368	WBSCR5	7	73036372	73056254
A7	OTTHUMT00007006353	WBSCR5	7	73036372	73056260
A7	ENSESTT00000036028		7	73036409	73047047
A7	ENSESTT00000036029		7	73036413	73055741
A7	ENSESTT00000036030		7	73036479	73055741
A7	ENSESTT00000036031		7	73036487	73056261
A7	ENSESTT00000036033		7	73041247	73055741
A7	ENSESTT00000036032		7	73041247	73056261
A7	ENSESTT00000036034		7	73042370	73055741
A7	ENST000000315652	WBSCR5	7	73042403	73051169

TABLE 3 (Continued)

A7	ENSESTT000000036035			7	73046885	73055741
A7	ENST00000055077	RFC2		7	73057931	73080835
A7	OTTHUMT00007006563	RFC2		7	73058100	73080829
A7	ENSESTT00000036108			7	73058332	73076209
A7	ENSESTT00000036107			7	73058332	73080717
A7	ENSESTT00000036106			7	73058332	73080816
A7	ENSESTT00000036105			7	73058332	73080827
A7	ENSESTT00000036103			7	73058332	73080835
A7	ENST000000275627	RFC2		7	73058533	73080810
A7	ENSESTT00000036104			7	73058566	73080828
A7	OTTHUMT00007006304	CYLN2		7	73115902	73232362
A7	ENST000000275634	CYLN2		7	73143935	73227994
A7	ENST000000223398	CYLN2		7	73143974	73227994
A7	ENSESTT00000036039			7	73183000	73202399
A7	ENSESTT00000036040			7	73183883	73202625
A7	ENSESTT00000036041			7	73202736	73227995
A7	ENSESTT00000036042			7	73203042	73227995
A7	ENSESTT00000036043			7	73212952	73230806
A7	OTTHUMT00007007106	GTF2IRD1		7	73280217	73429013
A7	ENST000000265755	GTF2IRD1		7	73334508	73428857
A7	ENSESTT00000036044			7	73346006	73381903
A7	ENSESTT00000036045			7	73350521	73364601
A7	OTTHUMT00007006631	WBSCR23		7	73358718	73361335
A7	OTTHUMT00007007275	Hs_7_c1118		7	73360975	73361085
A7	ENSESTT00000036046			7	73373585	73429028
A7	ENSESTT00000036047			7	73427384	73429022
A7	ENSESTT00000036048			7	73484123	73517534
A7	OTTHUMT00007006793	GTF2I		7	73484127	73587111
A7	ENSESTT00000036102			7	73515362	73526731
A7	ENSESTT00000036051			7	73515542	73564552

TABLE 3 (Continued)

A7	ENSESTT00000036052	7	73515542	73564552
A7	ENSESTT00000036049	7	73515542	73566495
A7	ENSESTT00000036050	7	73515542	73566495
A7	ENST000000324924	7	73515552	73585257
A7	ENST000000324906	7	73515552	73585257
A7	ENST000000324896	7	73515552	73587109
A7	ENSESTT00000036053	7	73517393	73555329
A7	ENSESTT00000036063	7	73569898	73575881
A7	ENSESTT00000036062	7	73569898	73581959
A7	ENSESTT00000036061	7	73569898	73585643
A7	ENSESTT00000036060	7	73569898	73586353
A7	ENSESTT00000036059	7	73569898	73586387
A7	ENSESTT00000036058	7	73569898	73586401
A7	ENSESTT00000036069	7	73571185	73575881
A7	ENSESTT00000036068	7	73571185	73581959
A7	ENSESTT00000036067	7	73571185	73585643
A7	ENSESTT00000036066	7	73571185	73586353
A7	ENSESTT00000036065	7	73571185	73586387
A7	ENSESTT00000036064	7	73571185	73586401
A7	ENSESTT00000036074	7	73572309	73581959
A7	ENSESTT00000036073	7	73572309	73585643
A7	ENSESTT00000036072	7	73572309	73586353
A7	ENSESTT00000036071	7	73572309	73586387
A7	ENSESTT00000036070	7	73572309	73586401
A7	ENSESTT00000036075	7	73574439	73581959
A7	ENSESTT00000036076	7	73583165	73585027
A7	ENSESTT00000036077	7	73584379	73586387
A7	OTTHUMT00007006732	7	73600398	73615746
A7	ENSESTT00000036086	7	73600417	73610049
A7	ENST000000289473	7	73600468	73615593
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	NCF1			

TABLE 3 (Continued)

A7	ENSESTT00000036087			7	73611674	73615748
A7	ENSESTT00000036088			7	73611704	73615748
A7	ENSESTT00000036089			7	73614408	73615753
A7	ENST000000302215		NM_032203	7	73622573	73679914
A7	OTTHUMT00007006446		mbhmh_H_NH0813J07			
			_F171046.fgenes2.2	7	73623090	73663589
A7	ENSESTT00000036101			7	73659841	73679927
A7	OTTHUMT00007007215		DKFZP434A0131.1	7	73706764	73718764
A7	ENST000000308103		NM_018991	7	73710352	73713295
A7	OTTHUMT00007008153		Hs_7_c5086	7	73711129	73713351
A7	OTTHUMT00007007303		Hs_7_c1127	7	73718511	73733865
A7	ENST000000318547		PMS2L5	7	73718985	73733868
A7	ENSESTT00000036090			7	73718990	73726032
A7	ENSESTT00000036091			7	73719013	73733949
A7	ENST000000318568		Q16673	7	73722332	73729180
A7	ENSESTT00000036092			7	73726925	73728321
A7	ENST000000333385		Q86WY7	7	73732679	73739325
A7	OTTHUMT00007006291		mfmh_chr7.73.013.a	7	73733861	73770943
A7	ENST000000328350			7	73737708	73740340
A7	ENST000000330313			7	73791140	73844306
A7	ENST000000332301			7	73791172	73850892
A7	ENSESTT00000036097			7	73868813	73883752
A7	ENST000000329959		WBSCR16	7	73869229	73901788
A7	ENSESTT00000036098			7	73882190	73901764
A7	ENSESTT00000036099			7	73889107	73901764
A7	ENSESTT00000036100			7	73892480	73901764
A7	ENST000000334260		Q86WX4	7	73920467	73954376
A7	ENSESTT00000036093			7	73920470	73940594
A7	ENST000000312575		NM_032203	7	73962893	73977192
A7	ENSESTT00000036094			7	73966809	73969279

TABLE 3 (Continued)

A7	ENST000000297905	7	73984689	73999836
A7	ENSESTT00000036095	7	73990260	73999885
A7	ENSESTT00000036096	7	73990542	73999843
A7	ENSESTT00000037870	7	74013902	74027990
A7	ENSESTT00000037865	7	74013902	74029114
A7	ENSESTT00000037876	7	74013902	74030393
A7	ENSESTT00000037871	7	74013903	74027990
A7	ENSESTT00000037866	7	74013903	74029114
A7	ENSESTT00000037877	7	74013903	74030393
A7	ENSESTT00000037872	7	74013951	74027990
A7	ENSESTT00000037867	7	74013951	74029114
A7	ENSESTT00000037878	7	74013951	74030393
A7	ENSESTT00000037873	7	74014662	74027990
A7	ENSESTT00000037868	7	74014662	74029114
A7	ENSESTT00000037879	7	74014662	74030393
A7	ENSESTT00000037875	7	74018346	74025862
A7	ENSESTT00000037874	7	74018346	74027990
A7	ENSESTT00000037869	7	74018346	74029114
A7	ENSESTT00000037880	7	74018346	74030393
A7	ENSESTT00000037864	7	74033799	74065179
A7	ENST000000335657	7	74111817	74114021
A7	ENSESTT00000037828	7	74114121	74528229
A7	ENSESTT00000037860	7	74114936	74600365
A7	ENST000000329909	7	74115017	74124654
A7	ENST000000311576	7	74115017	74126741
A7	ENSESTT00000037831	7	74378046	74402224
A7	ENSESTT00000037829	7	74386841	74402224
A7	ENSESTT00000037830	7	74400341	74402224
A7	ENSESTT00000037832	7	74412873	74413761
A7	ENSESTT00000037833	7	74415176	74417728

Q86WY7

PMS2L5

TABLE 3 (Continued)

A7	ENST000000317042	Q9P1E6	7	74415789	74416214
A7	OTTHUMT00007006787	mbhmh_h_72800966_			
		73394042_m_			
		132005738_13	7	74418388	74470222
A7	ENST000000311251		7	74419694	74479430
A7	OTTHUMT00007007356	Hs_7_c1145	7	74523575	74584324
A7	ENST000000333996	Q86WY7	7	74524542	74556308
A7	ENST000000335396	Q86WY7	7	74526082	74528285
A7	ENST000000302439	PMS2L6	7	74526852	74541042
A7	ENSESTT00000037834		7	74528385	74556252
A7	ENSESTT00000037862		7	74529200	74566962
A7	ENST000000311139	PMS2L5	7	74529281	74538934
A7	ENST000000314850		7	74529281	74541015
A7	OTTHUMT00007008169	Hs_7_c5090	7	74529284	74600754
A7	ENSESTT00000037861		7	74538952	74567012
A7	ENST000000251624	PMS2L6	7	74554875	74569067
A7	ENSESTT00000037835		7	74556408	74584271
A7	ENST000000305928		7	74557304	74569040
A7	ENST000000335010	Q86WY7	7	74582125	74584327
A7	ENSESTT00000037836		7	74584427	74743294
A7	ENSESTT00000037863		7	74585242	74594942
A7	ENST000000310939		7	74585323	74600345
A7	ENSESTT00000037837		7	74600539	74603386
A7	ENSESTT00000037838		7	74600635	74607984
A7	OTTHUMT00007008170	Hs_7_c5091	7	74605989	74608444
A7	ENST000000325462	NM_018991	7	74606045	74609003
A7	OTTHUMT00007007218	DKFZP434A0131.2	7	74606957	74631908
A7	ENSESTT00000037840		7	74607712	74637304
A7	ENSESTT00000037839		7	74607712	74640405
A7	ENSESTT00000037841		7	74611418	74612259



TABLE 3 (Continued)

A7	ENST000000275590	Q8WW08	7	74633749	74636644
A7	ENSEST000000037859		7	74634716	74636774
A7	OTTHUMT00007006277	mbhmh_h_73557902 _74457901_m _133948896_13			
A7	ENST000000323819	Q86UV7	7	74634728	74636644
A7	OTTHUMT00007006661	mfhmh_h_73557902_ _74457901_m _133948896_13		74636992	74646977
A7	ENSEST000000037842		7	74640307	74649026
A7	ENSEST000000037843		7	74640495	74645112
A7	OTTHUMT00007007377		7	74651721	74653100
A7	ENSEST000000037844	Hs_7_c1152	7	74651740	74657781
A7	ENSEST000000037845		7	74651742	74656591
A7	ENST000000323788	NM_145645	7	74652026	74657514
A7	ENSEST000000037846		7	74654800	74657968
A7	ENSEST000000037847		7	74655026	74657893
A7	ENSEST000000037848		7	74656958	74658035
A7	ENST000000257665	POM121	7	74657213	74657787
A7	ENSEST000000037858		7	74658837	74684082
A7	OTTHUMT00007006280	mbhmh_h_73557902 _74457901_m _133948896_13	7	74659912	74663188
A7	ENSEST000000037857		7	74660168	74684082
A7	ENSEST000000037856		7	74664350	74666568
A7	ENSEST000000037855		7	74666904	74679035
A7	ENSEST000000037854		7	74682449	74716115
A7	ENST000000301990		7	74716469	74769374
A7	OTTHUMT00007007168	mbhmh_ts.74.012.a	7	74736524	74745533
A7	OTTHUMT00007007383	Hs_7_c1157	7	74738139	74744350
				74744346	74752527

TABLE 3 (Continued)

A7	ENST000000248606	PMS2L3	7	74749246	74756200
A7	ENST000000301956	PMS2L9	7	74752342	74769228
A7	OTTHUMT00007007380	Hs_7_c1154	7	74753806	74769228
A7	ENSESTT00000037853		7	74757541	74769401
A7	OTTHUMT00007006447	HIP1	7	74775947	74840649
A7	ENSESTT00000037852		7	74779537	74786565
A7	ENST000000320938	HIP1	7	74779582	74980306
A7	ENSESTT00000037851		7	74788329	74797481
A7	ENSESTT00000037850		7	74799047	74804723
A7	ENSESTT00000037849		7	74895820	74980379
A7	OTTHUMT00007007406	Hs_7_c1160	7	74980208	74980327
A7	ENST00000005180	CCL26	7	75010931	75013663
A7	ENSESTT00000040258		7	75011028	75031153
A7	OTTHUMT00007006539	SCYA26	7	75011100	75013583
A7	ENST000000222902	CCL24	7	75053203	75055122
A7	OTTHUMT00007006535	SCYA24	7	75053203	75055122
A7	OTTHUMT00007007412	Hs_7_c1163	7	75077073	75077548
A7	ENST00000006777	NM_020684	7	75120355	75130328
A7	OTTHUMT00007007126	NPD007	7	75120355	75134177
A7	ENSESTT00000040185		7	75120424	75130279
A7	ENSESTT00000040186		7	75120432	75130279
A7	ENSESTT00000040257		7	75120464	75130107
A7	ENST000000318622	Q9UDT1	7	75120490	75122833
A7	ENSESTT00000040187		7	75120579	75129992
A7	ENSESTT00000040195		7	75156536	75222052
A7	ENSESTT00000040194		7	75156536	75225046
A7	ENSESTT00000040192		7	75156536	75225268
A7	ENSESTT00000040193		7	75156536	75225268
A7	ENSESTT00000040188		7	75156536	75226369
A7	ENSESTT00000040189		7	75156536	75226369

TABLE 3 (Continued)

A7	ENSESTT000000040190			7	75156536	75226369
A7	ENSESTT000000040191			7	75156536	75226369
A7	ENSESTT000000040202			7	75156536	75226773
A7	ENSESTT000000040203			7	75156536	75226773
A7	OTTHUMT00007007414		Hs_7_c1165	7	75164520	75164746
A7	OTTHUMT00007006487		mbhnh_h_73557902_			
			74457901_m			
			133948896_13	7	75176809	75227888
A7	ENSESTT000000040200			7	75195386	75225046
A7	ENSESTT000000040199			7	75195386	75225268
A7	ENSESTT000000040197			7	75195386	75226369
A7	ENSESTT000000040198			7	75195386	75226369
A7	ENSESTT000000040196			7	75195386	75226773
A7	ENST000000265302		POR	7	75195400	75227888
A7	ENSESTT000000040201			7	75223628	75226773
A7	OTTHUMT00007007077		TMPIIT	7	75228396	75236042
A7	ENSESTT000000040252			7	75229120	75236046
A7	ENSESTT000000040253			7	75229129	75236046
A7	ENSESTT000000040254			7	75229182	75236046
A7	ENSESTT000000040255			7	75229333	75236046
A7	ENSESTT000000040256			7	75229371	75236046
A7	ENSESTT000000040248			7	75237744	75255296
A7	ENSESTT000000040244			7	75237744	75289349
A7	ENSESTT000000040245			7	75237744	75289349
A7	ENSESTT000000040238			7	75237744	75289395
A7	ENSESTT000000040239			7	75237744	75289395
A7	ENSESTT000000040240			7	75237744	75289395
A7	ENSESTT000000040236			7	75237744	75295682
A7	ENSESTT000000040251			7	75237749	75242410
A7	ENSESTT000000040250			7	75237749	75246817

TABLE 3 (Continued)

A7	ENSESTT00000040249		7	75237749	75255296
A7	ENSESTT00000040247		7	75237749	75263402
A7	ENSESTT00000040246		7	75237749	75289349
A7	ENSESTT00000040241		7	75237749	75289395
A7	ENSESTT00000040242		7	75237749	75289395
A7	OTTHUMT00007006727	MK-STYX	7	75237749	75289410
A7	ENSESTT00000040237		7	75237749	75295682
A7	ENST00000248600	MSTY_HUMAN	7	75237875	75271930
A7	ENSESTT00000040243		7	75255146	75289370
A7	ENST00000315790		7	75288063	75288355
A7	ENSESTT00000040204		7	75289457	75308009
A7	ENST00000315758	MDH2	7	75289482	75308017
A7	OTTHUMT00007007151	MDH2	7	75289482	75308020
A7	ENSESTT00000040205		7	75289536	75308009
A7	ENSESTT00000040206		7	75305745	75308009
A7	OTTHUMT00007007750	Hs_7_c3073	7	75312957	75313204
A7	OTTHUMT00007007439	Hs_7_c1171	7	75315857	75316216
A7	OTTHUMT00007008045	Hs_7_c5123	7	75340845	75342813
A7	OTTHUMT00007007443	Hs_7_c1174	7	75349841	75373549
A7	ENST00000332057		7	75354317	75354842
A7	OTTHUMT00007007445	Hs_7_c1175	7	75354317	75354842
A7	OTTHUMT00007007446	Hs_7_c1176	7	75390863	75390964
A7	OTTHUMT00007007447	Hs_7_c1177	7	75415144	75418535
A7	ENSESTT00000040208		7	75443300	75501454
A7	ENSESTT00000040207		7	75443300	75506790
A7	ENSESTT00000040209		7	75443307	75506790
A7	ENSESTT00000040210		7	75476389	75501454
A7	ENST00000326382		7	75476473	75522894
A7	OTTHUMT00007006504	mbhmh_h_73557902 _74457901_m_			

TABLE 3 (Continued)

A7	133948896_13	7	75476474	75527249	
A7	ENSESTT00000040211			75514460	75522893
A7	ENSESTT00000040212			75523140	75527181
A7	ENST00000326284		NM_153043	75524053	75528692
A7	ENSESTT00000040213			75543994	75545679
A7	OTTHUMT00007006552		HSPB1	75544012	75545701
A7	ENST00000248553		HSPB1	75544012	75545702
A7	OTTHUMT00007006186		YWHAG	75568205	75600405
A7	ENST00000307630		YWHAG	75570983	75600214
A7	ENSESTT00000040235			75570997	75600397
A7	ENST00000325070			75602536	75603507
A7	ENST00000275560		SRCRB4D	75630735	75651095
A7	OTTHUMT00007006188		SRCRB4D	75630735	75651101
A7	ENSESTT00000040234			75631056	75638966
A7	ENST00000297799		Q96BF5	75631465	75635032
A7	OTTHUMT00007006555		ZP3A	75666341	75683471
A7	ENST00000257652		ZP3	75666371	75683468
A7	ENSESTT00000040214			75670977	75683476
A7	ENSESTT00000040215			75674328	75683368
A7	ENSESTT00000040216			75703078	75724019
A7	ENSESTT00000040217			75703114	75724170
A7	ENSESTT00000040218			75703116	75722103
A7	ENSESTT00000040219			75703123	75724122
A7	ENSESTT00000040220			75703136	75724190
A7	OTTHUMT00007006196		DTX2	75703141	75747397
A7	ENST00000324432		DTX2	75703143	75747007
A7	ENSESTT00000040221			75703158	75721985
A7	OTTHUMT00007007472		Hs_7_c1183	75711502	75712557
A7	ENST00000329896			75711568	75712530
A7	ENSESTT00000040222			75743571	75747401

TABLE 3 (Continued)

A7	ENSESTT00000040223		7	75751969	75756864
A7	ENSESTT00000040224		7	75751972	75755467
A7	ENSESTT00000040225		7	75752017	75756483
A7	ENST000000334348	UPK3B	7	75752059	75756610
A7	ENST000000257632	UPK3B	7	75752059	75756657
A7	ENSESTT00000040226		7	75752161	75755394
A7	ENSESTT00000040227		7	75752941	75756621
A7	ENST000000333674		7	75763339	75774103
A7	OTTHUMT00007007476	Hs_7_c1187	7	75765921	75774100
A7	ENST000000332397		7	75772915	75781708
A7	OTTHUMT00007007156	mbhmh_H DJ1158B01 _F218045. fgenes2.2			
A7	ENSESTT00000040233		7	75774096	75782865
A7	ENST000000328339		7	75775379	75781751
A7	OTTHUMT00007007474		7	75777575	75780226
A7	ENSESTT00000040229	Hs_7_c1186	7	75791024	75792928
A7	ENSESTT00000040228		7	75851392	75867091
A7	ENSESTT00000040232		7	75851392	75867499
A7	OTTHUMT00007006838	POMZP3	7	75851392	75867499
A7	ENST000000310842	POMZP3	7	75851394	75868655
A7	ENSESTT00000040230		7	75851570	75868652
A7	ENSESTT00000040231		7	75852858	75867011
A7	OTTHUMT00007007515		7	75859587	75868162
A7	OTTHUMT00007007518	Hs_7_c1194	7	75891805	75892303
A7	OTTHUMT00007007520	Hs_7_c1196	7	76201256	76245716
A7	ENST000000331556	Hs_7_c1197	7	76209601	76210656
A7	ENSESTT00000037296		7	76209667	76210629
A7	ENST000000307569		7	76214085	76218367
A7	ENST000000162863	PMS2L11	7	76220023	76231777
A7			7	76243584	76257202

TABLE 3 (Continued)

A7	ENSESTT000000037258	7	76243673	76245780
A7	ENSESTT000000037261	7	76255577	76265170
A7	ENSESTT000000037259	7	76257204	76440006
A7	OTTHUMT00007007328	7	76260312	76295598
A7	ENST00000285792	7	76263908	76269847
A7	ENSESTT00000037292	7	76264978	76266386
A7	OTTHUMT00007006602			
	mfhmh_gw11359887			
	.75188365.75365376			
	.7.9e-	7	76266095	76300760
A7	ENSESTT000000037291	7	76266148	76294084
A7	ENSESTT000000037295	7	76269559	76270744
A7	ENSESTT000000037294	7	76271927	76273767
A7	ENSESTT000000037293	7	76279424	76281262
A7	ENSESTT000000037290	7	76294463	76300803
A7	ENST00000330572	7	76297956	76299277
A7	OTTHUMT00007007330	7	76313155	76313732
A7	ENSESTT000000037289	7	76325407	76363754
A7	OTTHUMT00007006666			
	mbhmh_h_75248517			
	76148516_m_	7	76330887	76352916
	19731738_198	7	76351350	76363761
A7	ENSESTT000000037288	7	76356805	76357619
A7	ENST00000327285	7	76356814	76357592
A7	OTTHUMT00007007332	7	76364104	76409308
A7	ENSESTT000000037260	7	76437484	76441197
A7	OTTHUMT00007006412	7	76437495	76441207
A7	ENST00000248598	7	76437634	76441213
A7	ENSESTT000000037287			
A7	OTTHUMT00007006667			
	mbhmh_h_75248517			
	76148516_m_	7	76466089	76536234
	19731738_198			

TABLE 3 (Continued)

A7	ENST000000285871	Q96MS1	7	76478324	76520191
A7	ENST000000257657	Q9P223	7	76501336	76536578
A7	ENSESTT00000037262		7	76501508	76523986
A7	ENSESTT00000037264		7	76523852	76536589
A7	ENSESTT00000037263		7	76523852	76571386
A7	ENSESTT00000037284		7	76552119	76571745
A7	ENST000000257626	Q9Y4L9	7	76552120	76568852
A7	OTTHUMT00007007104	mbhnh nh h 75248517			
		76148516 m _			
		18931739 _			
			7	76552726	76605693
A7	ENSESTT00000037285		7	76552993	76571745
A7	ENSESTT00000037286		7	76562091	76567945
A7	ENST000000334003	Q8ND73	7	76571601	76647477
A7	ENSESTT00000037283		7	76571643	76596756
A7	OTTHUMT00007007105	mbhnh nh h 75248517			
		76148516 m _			
		18931739 _			
			7	76611431	76653274
A7	ENSESTT00000037282		7	76638369	76657235
A7	ENST000000310324	Q9BXE6	7	76751393	76751767
A7	ENSESTT00000037265		7	76778862	76839272
A7	OTTHUMT00007006825	PTPN12	7	76778886	76881437
A7	ENSESTT00000037266		7	76778907	76842330
A7	ENST000000248594	PTPN12	7	76778915	76880648
A7	ENSESTT00000037267		7	76805409	76842330
A7	ENSESTT00000037269		7	76848601	76881437
A7	ENSESTT00000037270		7	76848601	76881437
A7	ENSESTT00000037271		7	76848601	76881437
A7	ENSESTT00000037268		7	76848601	76895005
A7	ENSESTT00000037272		7	76873632	76881437
A7	ENSESTT00000037281		7	76875004	76889253



TABLE 3 (Continued)

A7	ENSESTT00000037273	7	76878133	76881437
A7	ENSESTT00000037274	7	76878340	76880309
A7	ENSESTT00000037278	7	76900557	76937634
A7	ENSESTT00000037275	7	76910887	76912750
A7	ENSESTT00000037279	7	76925217	76937634
A7	ENSESTT00000037280	7	76925311	76937620
A7	ENST000000334955	7	76937838	76977836
A7	OTTHUMT00007006307			
A7	ENSESTT00000037277	7	76937838	77020536
A7	ENSESTT00000037276	7	76977776	76991120
A7	ENSESTT00000031431	7	76990885	77010048
A7	OTTHUMT00007006265	7	77010043	77021059
A7	ENST00000257663	7	77035083	77039701
A7	ENSESTT00000031444	7	77035084	77039798
A7	ENSESTT00000031445	7	77035096	77039946
A7	OTTHUMT00007006310	7	77035258	77039797
A7	ENST00000248550	7	77081624	77196246
A8	ENST00000256653	7	77096101	77195265
A8	ENSESTT00000003501	1	117256452	117415542
A8	ENSESTT00000003500	1	117256479	117412324
A8	ENSESTT00000003502	1	117256479	117414355
A8	ENSESTT00000003523	1	117331232	117385841
A8	ENSESTT00000003503	1	117485833	117494713
A8	ENST00000328500	1	117494976	117512577
A8	ENST00000328500	1	117495052	117517367
A8	ENST00000313132	1	117529727	117530632
A8	ENST00000334351	1	117667090	117667509

TABLE 3 (Continued)

A8	ENSESTT000000003522		1	117667118	117667900
A8	ENSESTT000000003520		1	117759186	117818631
A8	ENSESTT000000003521		1	117759281	117818631
A8	ENST00000263166	GDAP2	1	117759572	117818591
A8	ENSESTT000000003504		1	117818779	117823687
A8	ENST00000309112	Q9H141	1	117822324	117848451
A8	ENST00000183319	WDR3	1	117822324	117849059
A8	ENSESTT000000003505		1	117831482	117849104
A8	ENSESTT000000003518		1	117842855	117853814
A8	ENSESTT000000003515		1	117842859	117859122
A8	ENSESTT000000003519		1	117842865	117852907
A8	ENSESTT000000003517		1	117842865	117855703
A8	ENST00000286203	Q8NAZ1	1	117842866	118074161
A8	ENSESTT000000003516		1	117842868	117855764
A8	ENSESTT000000003513		1	117861020	117880531
A8	ENSESTT000000003514		1	117862486	117876996
A8	ENSESTT000000003512		1	117885713	117905184
A8	ENSESTT000000003510		1	117917336	117943048
A8	ENSESTT000000003511		1	117920750	117928350
A8	ENSESTT000000003509		1	117943055	117962920
A8	ENSESTT000000003507		1	117943058	117970490
A8	ENSESTT000000003508		1	117962945	117970300
A8	ENSESTT000000003506		1	117974982	117976166
A8	ENSESTT000000003436		1	118039391	118074185
A8	ENST00000334368	Q9UN81	1	118742261	118743277
A8	ENST00000207157	TBX15	1	118772051	118820834
A8	ENSESTT000000003435		1	118889344	118890396
A8	ENSESTT000000003434		1	118889622	118890409
A8	ENST00000235521	WARS2	1	118920227	119029659
A8	ENSESTT000000003433		1	118921825	118934670

TABLE 3 (Continued)

A8	ENSESTT000000003432	1	118922024	119029623
A8	ENST00000333224	1	119015816	119016295
A8	ENSESTT000000003526	1	119035413	119036037
A8	ENST00000330630	1	119108318	119108923
A8	ENSESTT000000003527	1	119217196	119219818
A8	ENSESTT000000003528	1	119217256	119245186
A8	ENSESTT000000003529	1	119257783	119275698
A8	ENSESTT000000003531	1	119257783	119281249
A8	ENSESTT000000003530	1	119269568	119281249
A8	ENST00000325945	1	119270090	119282844
A8	ENST00000331050	1	119304149	119403649
A8	ENSESTT000000003533	1	119304154	119311277
A8	ENSESTT000000003532	1	119304154	119311779
A8	ENSESTT000000003534	1	119304167	119308609
A8	ENST00000303184	1	119304424	119311624
A8	ENST00000333709	1	119304427	119403649
A8	ENST00000332017	1	119304427	119404056
A8	ENST00000256586	1	119328005	119334823
A8	ENST00000286193	1	119356225	119362218
A8	ENST00000331024	1	119385611	119385839
A8	ENSESTT000000003535	1	119396243	119404058
A8	ENSESTT000000003536	1	119396244	119397374
A8	ENSESTT000000003537	1	119396322	119404058
A8	ENST00000235547	1	119396481	119403649
A8	ENST00000335580	1	119456897	119461071
A8	ENST00000331009	1	119485270	119485838
A8	ENST00000335229	1	119494238	119494381
A8	ENST00000271263	1	119511709	119512401
A8	ENSESTT000000003538	1	119600896	119633222
A8	ENSESTT000000003539	1	119600896	119633222
			HAO2	
			Q8TDP9	
			HSD3B2	
			Q8TDP9	
			Q8TDP9	
			Q9H1N0	
			Q9H1M9	
			HSD3B1	
			Q9UDK8	
			Q9UD07	
			Q96IT2	

TABLE 3 (Continued)

A8	ENST000000263167	PHGDH	1	119601027	119633206
A8	ENSESTT00000003540		1	119615847	119633222
A8	ENSESTT00000003541		1	119615847	119633222
A8	ENSESTT00000003542		1	119616052	119619075
A8	ENSESTT00000003543		1	119626114	119633222
A8	ENST00000256633	HMGCS2	1	119637386	119657898
A8	ENSESTT00000003552		1	119637543	119657890
A8	ENSESTT00000003553		1	119648894	119657887
A8	ENSESTT00000003544		1	119653323	119657877
A8	ENST00000324032	Q8NER6	1	119683168	119700499
A8	ENSESTT00000003551		1	119683421	119700465
A8	ENSESTT00000003550		1	119683593	119692170
A8	ENST00000256585	REG4	1	119683622	119697773
A8	ENSESTT00000003549		1	119687553	119697870
A9	OTTHUMT00000003549	SLC26A8-001	6	35958152	36039212
A9	ENST00000229784	SLC26A8	6	35958327	36034339
A9	ENST00000310888	SLC26A8	6	35958532	36034339
A9	ENSESTT000000033005		6	36012429	36039125
A9	ENSESTT000000032935		6	36042425	36067456
A9	OTTHUMT0000000606277	MAPK14-002	6	36042428	36123079
A9	OTTHUMT0000000606276	MAPK14-001	6	36042428	36125390
A9	ENST00000229794	NM 139014	6	36042790	36122248
A9	ENST00000229795	MAPK14	6	36042790	36123079
A9	ENST00000310795	MAPK14	6	36042790	36123079
A9	ENSESTT000000032936		6	36090530	36124509
A9	OTTHUMT0000000606258	dJ179N16.3-001	6	36106623	36107278
A9	OTTHUMT0000000606270	MAPK13-005	6	36142441	36150464
A9	ENSESTT000000032938		6	36142441	36154698
A9	ENSESTT000000032937		6	36142441	36155902
A9	OTTHUMT0000000606268	MAPK13-003	6	36144953	36154312

TABLE 3 (Continued)

A9	OTTHUMT000006006266	MAPK13-001	6	36144953	36154697
A9	ENST00000211287	MAPK13	6	36145117	36154697
A9	ENSESTT00000032940		6	36145142	36154698
A9	ENSESTT00000032939		6	36145142	36155902
A9	ENSESTT00000032941		6	36145145	36151536
A9	ENSESTT00000032943		6	36145202	36154698
A9	ENSESTT00000032942		6	36145202	36155902
A9	ENSESTT00000032944		6	36145273	36146034
A9	OTTHUMT00006006269	MAPK13-004	6	36145295	36153839
A9	OTTHUMT00006006267	MAPK13-002	6	36145501	36151147
A9	OTTHUMT00006006280	BRPF3-001	6	36211405	36247418
A9	ENST00000322766	BRPF3	6	36211405	36247421
A9	ENSESTT00000032945		6	36212028	36215240
A9	ENSESTT00000032946		6	36215902	36224498
A9	OTTHUMT00006006281	BRPF3-002	6	36225130	36247418
A9	ENST00000211291	Q9NWM1	6	36225982	36245352
A9	ENSESTT00000032947		6	36228665	36232584
A9	ENSESTT00000032948		6	36239919	36246148
A9	OTTHUMT00006006284	dJ50J22.1-001	6	36285116	36310051
A9	ENST00000312917	PNPLA1	6	36306032	36323227
A9	OTTHUMT00006006294	dJ50J22.5-001	6	36317034	36327443
A9	OTTHUMT00006006290	dJ50J22.3-001	6	36331805	36334066
A9	OTTHUMT00006006286	dJ50J22.2-001	6	36380826	36402415
A9	OTTHUMT00006006287	dJ50J22.2-002	6	36380826	36402415
A9	ENST00000229480	ETV7	6	36380827	36402349
A9	ENSESTT00000033001		6	36390551	36402400
A9	OTTHUMT00006006292	dJ50J22.4-001	6	36401463	36406626
A9	ENST00000316266	NM_152990	6	36405183	36415166
A9	OTTHUMT00006006296	dJ347L7.1-001	6	36415095	36457521
A9	ENSESTT00000032949		6	36457399	36458352

TABLE 3 (Continued)

A9	ENST000000265344	C6orf69	6	36457399	36505168
A9	OTTHUMT00006006298	dJ108K11.3-001	6	36457619	36505775
A9	ENSESTT00000032950		6	36484759	36499460
A9	ENSESTT00000032952		6	36499410	36503191
A9	ENSESTT00000032951		6	36499410	36505772
A9	ENSESTT00000032953		6	36501514	36505772
A9	OTTHUMT00006006300	STK38-001	6	36508524	36562102
A9	ENST00000229812	STK38	6	36508531	36562102
A9	ENSESTT00000032999		6	36510468	36522221
A9	ENSESTT00000032996		6	36530077	36562102
A9	ENSESTT00000032955		6	36608994	36616435
A9	ENSESTT00000032954		6	36608994	36617545
A9	OTTHUMT00006006302	SFRS3-001	6	36609000	36618064
A9	OTTHUMT00006006303	SFRS3-002	6	36609023	36616672
A9	ENST0000024437	SFRS3	6	36611395	36617408
A9	ENST00000317631		6	36688401	36689903
A9	OTTHUMT00006006306	dJ193M11.1-001	6	36688449	36689902
A9	OTTHUMT00006012688	CDKN1A-005	6	36691160	36699143
A9	ENSESTT00000032956		6	36692420	36701950
A9	OTTHUMT00006012684	CDKN1A-001	6	36693290	36701971
A9	ENST00000244741	CDKN1A	6	36693342	36701963
A9	OTTHUMT00006012685	CDKN1A-002	6	36693353	36700556
A9	ENSESTT00000032957		6	36693354	36701950
A9	OTTHUMT00006012687	CDKN1A-004	6	36693358	36699130
A9	OTTHUMT00006012686	CDKN1A-003	6	36693403	36695312
A9	ENSESTT00000032958		6	36693403	36695312
A9	OTTHUMT00006011804	dJ431A14.3-001	6	36737227	36743433
A9	ENST00000229824		6	36737257	36745385
A9	ENST00000310390	Q8TDV1	6	36751637	36752338
A9	OTTHUMT00006006308	dJ431A14.4-001	6	36751682	36752618

TABLE 3 (Continued)

A9	OTTHUMT00006006311	dJ431A14.5-002	6	36755407	36772013
A9	ENST00000244751	CPNE5	6	36755410	36854008
A9	OTTHUMT00006006310	dJ431A14.5-001	6	36755410	36854633
A9	ENSESTT0000032989		6	36758313	36772015
A9	OTTHUMT00006006312	dJ431A14.5-003	6	36760019	36772013
A9	ENSESTT0000032990		6	36760019	36772013
A9	ENSESTT0000032987		6	36760019	36780337
A9	ENSESTT0000032988		6	36760024	36772025
A9	OTTHUMT00006006351	PPIL1-002	6	36869458	36873266
A9	OTTHUMT00006006350	PPIL1-001	6	36869458	36889655
A9	ENST00000244367	PPIL1	6	36869463	36889629
A9	ENSESTT0000032983		6	36870099	36889655
A9	ENSESTT0000032984		6	36870254	36886506
A9	OTTHUMT00006006316	dJ90K10.2-001	6	36886501	36939186
A9	OTTHUMT00006006319	dJ90K10.2-004	6	36900485	36931139
A9	OTTHUMT00006006317	dJ90K10.2-002	6	36900495	36938153
A9	OTTHUMT00006006318	dJ90K10.2-003	6	36900495	36938153
A9	ENST00000314503	C6orf89	6	36900495	36941175
A9	ENSESTT0000032959		6	36900540	36938610
A9	OTTHUMT00006006320	dJ90K10.2-005	6	36900544	36938203
A9	ENSESTT0000032960		6	36900558	36929229
A9	ENSESTT0000032961		6	36909132	36938610
A9	OTTHUMT00006006326	dJ90K10.3-001	6	36943210	36943499
A9	OTTHUMT00006006328	dJ90K10.4-001	6	36954718	36959306
A9	ENST00000297048	PI16	6	36969064	36979463
A9	OTTHUMT00006006330	dJ90K10.5-001	6	36969064	36979468
A9	ENSESTT0000032962		6	36969360	36974006
A9	ENSESTT0000032963		6	36969368	36978833
A9	ENSESTT0000032964		6	36969383	36978833
A9	OTTHUMT00006006331	dJ90K10.5-002	6	36977621	36979298

TABLE 3 (Continued)

A9	OTTHUMT00006006335	dJ90K10.6-002	6	36982772	36991863
A9	OTTHUMT00006006341	dJ90K10.6-008	6	36982772	37000929
A9	OTTHUMT00006006334	dJ90K10.6-001	6	36982772	37000929
A9	ENSESTT00000032969		6	36983213	36992788
A9	ENSESTT00000032965		6	36983213	37000795
A9	ENSESTT00000032966		6	36983310	37000795
A9	ENSESTT00000032967		6	36983310	37000795
A9	OTTHUMT00006006340	dJ90K10.6-007	6	36983368	37000612
A9	ENST00000259958	MTCH1	6	36983368	37000747
A9	OTTHUMT00006006337	dJ90K10.6-004	6	36983391	36985547
A9	OTTHUMT00006006336	dJ90K10.6-003	6	36983543	36992304
A9	OTTHUMT00006006338	dJ90K10.6-005	6	36984097	36987385
A9	ENSESTT00000032968		6	36984669	37000795
A9	OTTHUMT00006006339	dJ90K10.6-006	6	36984687	36987307
A9	OTTHUMT00006006356	FGD2-001	6	37020277	37042929
A9	ENSESTT00000035539		6	37020289	37026654
A9	ENSESTT00000035540		6	37020301	37028317
A9	ENST00000274963	FGD2	6	37020330	37043169
A9	ENSESTT00000035541		6	37040439	37042882
A9	OTTHUMT00006006354	dJ405J24.2-001	6	37059462	37060032
A9	ENST00000297147	O95101	6	37059560	37059820
A9	OTTHUMT00006006358	dJ441G21.1-001	6	37105853	37106493
A9	ENST00000310055		6	37105943	37106437
A9	ENSESTT00000035542		6	37184786	37185779
A9	ENSESTT00000035543		6	37184786	37185779
A9	OTTHUMT00006012708	PIM1-003	6	37184834	37190057
A9	ENST00000259722	PIM1	6	37184841	37190057
A9	ENSESTT00000035544		6	37185789	37190059
A9	OTTHUMT00006012709	PIM1-004	6	37187099	37188878
A9	ENSESTT00000035545		6	37187103	37190059



TABLE 3 (Continued)

A9	OTTHUMT00006012706	PIM1-001	6	37187125	37188943
A9	ENSESTT0000035546		6	37187125	37190059
A9	OTTHUMT00006012707	PIM1-002	6	37187627	37190057
A9	OTTHUMT00006006360	dJ355M6.2-001	6	37226811	37272786
A9	ENST00000316899	Q8TC54	6	37226812	37233661
A9	OTTHUMT00006006361	dJ355M6.2-002	6	37227067	37272267
A9	ENST00000316909	NM_145316	6	37229829	37233661
A9	ENSESTT0000035577		6	37233261	37272786
A9	OTTHUMT00006006364	dJ744I24.2-001	6	37272403	37347601
A9	ENSESTT0000035547		6	37272498	37294209
A9	ENST00000229492	C6orf197	6	37298967	37347600
A9	ENSESTT0000035548		6	37331324	37347601
A9	ENSESTT0000035549		6	37331816	37339289
A9	OTTHUMT00006006366	RNF8-001	6	37368684	37409364
A9	ENSESTT0000035550		6	37368716	37386205
A9	ENST00000229866	RNF8	6	37368796	37395990
A9	ENSESTT0000035551		6	37383509	37405872
A9	OTTHUMT00006006367	RNF8-002	6	37383520	37391647
A9	ENSESTT0000035554		6	37383557	37405862
A9	ENSESTT0000035552		6	37383557	37405872
A9	ENSESTT0000035553		6	37383557	37405872
A9	ENSESTT0000035555		6	37391555	37405872
A9	ENSESTT0000035556		6	37447848	37474233
A9	OTTHUMT00006006384	dJ153P14.1-009	6	37447850	37458714
A9	ENSESTT0000035557		6	37447850	37474233
A9	OTTHUMT00006006377	dJ153P14.1-002	6	37447851	37476692
A9	OTTHUMT00006006376	dJ153P14.1-001	6	37447851	37496137
A9	ENST00000259729	NM_015050	6	37450261	37496137
A9	OTTHUMT00006006383	dJ153P14.1-008	6	37467109	37473320
A9	ENSESTT0000035558		6	37474283	37488203

TABLE 3 (Continued)

A9	OTTHUMT000006006378	dJ153P14.1-003	6	37474290	37476703
A9	ENSESTT0000035559		6	37474290	37476703
A9	OTTHUMT000006006380	dJ153P14.1-005	6	37477502	37495903
A9	OTTHUMT000006006379	dJ153P14.1-004	6	37488199	37493826
A9	ENSESTT0000035560		6	37489154	37496138
A9	ENSESTT0000035561		6	37489159	37493872
A9	OTTHUMT000006006382	dJ153P14.1-007	6	37489950	37497458
A9	ENSESTT0000035562		6	37489950	37497460
A9	OTTHUMT000006006381	dJ153P14.1-006	6	37489976	37495777
A9	OTTHUMT000006006394	dJ153P14.2-001	6	37497551	37514553
A9	ENSESTT0000035575		6	37497563	37514525
A9	ENST00000259975	Q9P0B6	6	37497563	37514553
A9	ENSESTT0000035576		6	37497569	37499495
A9	ENSESTT0000035574		6	37497716	37514544
A9	OTTHUMT000006006395	dJ153P14.2-002	6	37497716	37514553
A9	OTTHUMT000006006370	dJ153P14.3-001	6	37558184	37561386
A9	ENSESTT0000035573		6	37558184	37561393
A9	OTTHUMT000006006372	dJ153P14.4-001	6	37561183	37562345
A9	ENSESTT0000035563		6	37564634	37565497
A9	OTTHUMT000006006374	dJ153P14.5-001	6	37564635	37565491
A9	ENSESTT0000035571		6	37651734	37660878
A9	OTTHUMT000006006400	dJ402N21.2-001	6	37651734	37669174
A9	ENST00000297153	MDGA1	6	37651999	37711442
A9	ENST00000229875	Q8NBE3	6	37652690	37660859
A9	ENSESTT0000035572		6	37653259	37656528
A9	ENSESTT0000035568		6	37663817	37669088
A9	ENSESTT0000035570		6	37664502	37666973
A9	ENSESTT0000035569		6	37664502	37669088
A9	OTTHUMT000006006398	dJ402N21.1-001	6	37670396	37711576
A9	ENSESTT0000035567		6	37672943	37711576

TABLE 3 (Continued)

A9	OTTHUMT00006006402	dJ441A12.1-001	6	37830408	37833849
A9	ENSESTT0000035566		6	37833212	37833973
A9	ENSESTT0000035564		6	37834162	37944634
A9	OTTHUMT00006006406	TEX27-001	6	37834162	38169252
A9	ENSESTT0000035565		6	37834188	38166902
A9	ENST00000287218	TEX27	6	37834577	38167020
A9	OTTHUMT00006006407	TEX27-002	6	37944570	38097088
A9	ENSESTT0000028267		6	38016900	38018551
A9	OTTHUMT00006006404	bA420A21.1-001	6	38017463	38017944
A9	OTTHUMT00006006408	TEX27-003	6	38076242	38077291
A9	ENSESTT0000028247		6	38076350	38168417
A9	OTTHUMT00006006409	TEX27-004	6	38131203	38156962
A9	OTTHUMT00006006414	dJ295F6.2-001	6	38177432	38178435
A9	OTTHUMT00006006425	dJ322I12.1-004	6	38185948	38654445
A9	OTTHUMT00006006416	dJ322I12.2-001	6	38188304	38191924
A9	OTTHUMT00006006426	dJ322I12.1-005	6	38189588	38359724
A9	ENSESTT0000028266		6	38189682	38271074
A9	ENST00000320902	Q8NAH5	6	38193995	38194495
A9	OTTHUMT00006006423	dJ322I12.1-002	6	38302912	38594901
A9	ENSESTT0000028248		6	38496227	38497741
A9	OTTHUMT00006006418	bA430C17.1-001	6	38496323	38497162
A9	OTTHUMT00006006422	dJ322I12.1-001	6	38592231	38610698
A9	OTTHUMT00006006420	dJ319M7.2-001	6	38601954	38603160
A9	ENST00000328403	BTBD9	6	38607118	38612725
A9	OTTHUMT00006006424	dJ322I12.1-003	6	38608899	38654542
A9	OTTHUMT00006006435	GLO1-002	6	38690574	38697846
A9	OTTHUMT00006006434	GLO1-001	6	38690574	38717772
A9	ENST0000024746	GLO1	6	38690575	38717772
A9	ENSESTT0000028264		6	38690577	38717784
A9	ENSESTT0000028262		6	38691212	38699147

TABLE 3 (Continued)

A9	ENSESTT00000028258		6	38691212	38717784
A9	ENSESTT00000028265		6	38691212	38717784
A9	ENSESTT00000028263		6	38691365	38696733
A9	ENSESTT00000028259		6	38696639	38717784
A9	ENSESTT00000028260		6	38696641	38717784
A9	ENSESTT00000028261		6	38697434	38717784
A9	OTTHUMT00006006432	dJ503A6.2-001	6	38728682	38729848
A9	ENSESTT00000028257		6	38728682	38729848
A9	ENST00000327475	Q8IU65	6	38729972	38749145
A9	OTTHUMT00006012038	DNAH8-003	6	38737477	38986711
A9	OTTHUMT00006012037	DNAH8-002	6	38737477	39045150
A9	OTTHUMT00006012036	DNAH8-001	6	38737753	39045156
A9	ENST00000244699	DNAH8	6	38749146	39045422
A9	OTTHUMT00006011850	dJ217P22.2-001	6	38777536	38779325
A9	ENSESTT00000028249		6	38872332	38878623
A9	OTTHUMT00006012039	DNAH8-004	6	38878600	38885121
A9	ENSESTT00000028250		6	38887623	38888176
A9	OTTHUMT00006006438	dJ207H1.3-001	6	38937660	38946002
A9	OTTHUMT00006006439	dJ207H1.3-002	6	38937660	38967730
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A9	OTTHUMT00006011974	dJ207H1.2-001	6	38942662	38942784
A9	OTTHUMT00006006440	dJ207H1.3-003	6	38943981	38947548
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A9	ENSESTT00000028254		6	38958559	38967720
A9	ENSESTT00000028252		6	38966101	38988421
A9	ENSESTT00000028253		6	38998885	39027120
A9	ENSESTT00000028268		6	39027083	39045160
A9	OTTHUMT00006006452	dJ202I21.3-001	6	39054234	39054616
A9	OTTHUMT00006006444	GLP1R-001	6	39063429	39102374

TABLE 3 (Continued)

A9	ENST000000229900	GLP1R	6	39063472	39100704
A9	ENSESTT00000028298		6	39118691	39124040
A9	ENSESTT00000028296		6	39118691	39129820
A9	OTTHUMT00006006446	dJ202I21.1-001	6	39118695	39124203
A9	OTTHUMT00006006448	dJ202I21.1-003	6	39118695	39129820
A9	ENST000000229903	C6orf64	6	39119524	39129720
A9	OTTHUMT00006006454	dJ202I21.5-001	6	39124952	39127583
A9	OTTHUMT00006006447	dJ202I21.1-002	6	39127706	39129702
A9	ENSESTT00000028297		6	39127885	39129702
A9	OTTHUMT00006006456	KCNK5-001	6	39203604	39244081
A9	ENST000000297169	KCNK5	6	39205521	39243742
A9	ENSESTT00000028294		6	39205943	39243759
A9	ENSESTT00000028295		6	39208772	39243759
A9	OTTHUMT00006006464	KCNK17-001	6	39313632	39329053
A9	ENSESTT00000028293		6	39314030	39315137
A9	ENSESTT00000028292		6	39314058	39319209
A9	ENST000000244759	KCNK17	6	39314058	39328951
A9	OTTHUMT00006006462	KCNK16-001	6	39329336	39337171
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A9	ENST000000211196	KCNK16	6	39329633	39337171
A9	ENSESTT00000028291		6	39332507	39337185
A9	ENSESTT00000028289		6	39350785	39358362
A9	OTTHUMT00006006460	dJ137F1.4-001	6	39350785	39400304
A9	ENST000000297170	C6orf102	6	39358338	39445790
A9	ENST000000229913	Q86T87	6	39358338	39554716
A9	OTTHUMT00006006458	dJ137F1.3-001	6	39368378	39368803
A9	OTTHUMT00006006466	dJ188D3.1-001	6	39434570	39445946
A9	OTTHUMT00006006470	dJ1043E3.1-001	6	39554634	39740037
A9	ENSESTT00000028286		6	39554831	39599605
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TABLE 3 (Continued)

A9	OTTHUMT00006006472	dJ1043E3.1-003	6	39559134	39592907
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A9	ENSESTT0000028288		6	39559179	39592907
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A9	OTTHUMT00006006468	dJ1043E3.2-001	6	39568448	39569574
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A9	OTTHUMT00006006471	dJ1043E3.1-002	6	39597806	39610891
A9	ENSESTT0000028283		6	39610746	39689117
A9	OTTHUMT00006006473	dJ1043E3.1-004	6	39705830	39729590
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A9	ENSESTT0000028269		6	39807005	39879702
A9	ENST00000274867	DAAM2	6	39807649	39919503
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A9	ENSESTT0000028271		6	39863403	39875800
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A9	OTTHUMT00006006485	dJ278E11.1-002	6	39870878	39882152
A9	OTTHUMT00006006484	dJ278E11.1-001	6	39870878	39919499
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A9	ENSESTT0000028272		6	39884968	39893094
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A9	OTTHUMT00006006488	dJ278E11.1-005	6	39902036	39905992
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A9	OTTHUMT00006006481	bA61I13.3-002	6	39903505	39912011
A9	ENSESTT0000028281		6	39903505	39912011
A9	ENSESTT0000028273		6	39911507	39913571
A9	ENSESTT0000028274		6	39911802	39919761
A9	OTTHUMT00006006478	bA61I13.2-001	6	39911971	39914702
A9	ENSESTT0000028279		6	39917315	39919496
A9	ENSESTT0000028280		6	39917519	39918030
A9	OTTHUMT00006006504	MOCS1-005	6	39919690	39926973

TABLE 3 (Continued)

TABLE 3 (Continued)

A9	OTTHUMT000006006530		bA121P10.1-001	6	40516225	40516987
A9	ENSESTT00000026514			6	40516225	40516987
A9	OTTHUMT000006006534		dJ462C17.1-001	6	40530930	40538527
A9	ENSESTT00000026513			6	40530930	40538527
A9	OTTHUMT000006006536		bA570K4.1-001	6	40728005	40729957
A9	ENSESTT00000026511			6	40728005	40729957
A10	ENSESTT00000052482			18	71312402	71313353
A10	ENSESTT00000052481			18	71536395	71551301
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A10	ENSESTT00000056790			18	72048442	72054756
A10	ENSESTT00000056791			18	72098098	72099051
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A10	ENST00000320610		ZNF236	18	72688458	72807272
A10	ENSESTT00000056797			18	72717002	72734201
A10	ENSESTT00000056796			18	72717002	72734313
A10	ENSESTT00000056798			18	72737983	72747435
A10	ENSESTT00000056799			18	72815875	72819321
A10	ENST00000318747		MBP	18	72817767	72855988
A10	ENSESTT00000056804			18	72819098	72855989
A10	ENSESTT00000056803			18	72819230	72856028
A10	ENSESTT00000056805			18	72819273	72855988
A10	ENST00000281193			18	72819360	72828993
A10	ENSESTT00000056800			18	72820171	72823085



TABLE 3 (Continued)

A10	ENSESTT000000056801	18	72820171	72823085
A10	ENSESTT000000056802	18	72855561	72905291
A10	ENST000000309607	18	72867119	72867493
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A10	ENSESTT000000052501	18	73089280	73095131
A10	ENSESTT000000052502	18	73092673	73095150
A10	ENSESTT000000052503	18	73461485	73463448
A10	ENSESTT000000052478	18	74655974	74657295
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A10	ENST000000299466	18	74839252	74857165
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A10	ENSESTT000000052475	18	74854402	74861654
A10	ENST000000307671	18	74928369	75236360
A10	ENSESTT000000052476	18	74928431	74972951
A10	ENSESTT000000065967	18	75162658	75191977
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A10	ENSESTT000000065968	18	75195603	75237133
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A10	ENSESTT000000065970	18	75203163	75237133
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A10	ENSESTT000000065971	18	75255250	75270171
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A10	ENSESTT000000065975	18	75270434	75311108
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A10	ENSESTT000000065978	18	75310647	75327154
A10	ENST000000334423	18	75314345	75314808
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NM_172387				

TABLE 3 (Continued)

A10	ENST000000334083	18	75363755	75810501
A10	ENST000000333925	18	75363758	75550986
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A10	ENSESTT00000066011	18	75403966	75404501
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A10	ENST000000299543	18	75538778	75613484
A10	ENST00000075430	18	75538925	75595497
A10	ENSESTT00000066010	18	75561698	75562628
A10	ENSESTT00000065980	18	75563836	75573932
A10	ENSESTT00000065981	18	75573941	75613484
A10	ENSESTT00000065982	18	75588015	75613484
A10	ENSESTT00000065983	18	75594535	75613484
A10	ENST000000316249	18	75722645	75758793
A10	ENSESTT00000066009	18	75761442	75762272
A10	ENSESTT00000066008	18	75761446	75762510
A10	ENST000000316111	18	75761465	75810007
A10	ENSESTT00000066004	18	75762569	75809829
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A10	ENSESTT00000066002	18	75762569	75809842
A10	ENSESTT00000065999	18	75762569	75809843
A10	ENSESTT00000066000	18	75762569	75809843
A10	ENSESTT00000066006	18	75762650	75809829
A10	ENSESTT00000066001	18	75762650	75809843
A10	ENST000000262199	18	75762953	75802393
A10	ENSESTT00000066003	18	75763093	75809836
A10	ENSESTT00000066007	18	75774508	75775293
A10	ENSESTT00000065984	18	75823637	75826139
A10	ENSESTT00000065998	18	75825557	75831889

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NM\_025078

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TABLE 3 (Continued)

A10	ENST000000269601	DIM1_HUMAN	18	75831846	75847511
A10	ENSESTT00000065996		18	75832383	75836894
A10	ENSESTT00000065991		18	75832383	75847550
A10	ENSESTT00000065993		18	75832384	75847452
A10	ENSESTT00000065995		18	75832396	75847330
A10	ENSESTT00000065994		18	75832490	75847391
A10	ENSESTT00000065997		18	75832541	75835766
A10	ENSESTT00000065992		18	75832715	75847514
A10	ENST00000306735	NM_024805	18	75893335	75905364
A10	ENSESTT00000065986		18	75893389	75901198
A10	ENSESTT00000065985		18	75893389	75905374
A10	ENSESTT00000065990		18	75893434	75905357
A10	ENST00000262197	Q8WZ65	18	75893473	75904914
A10	ENSESTT00000065987		18	75896424	75905374
A10	ENSESTT00000065988		18	75926233	75938117
A10	ENST00000262198	NM_014913	18	75966162	75997201
A10	ENSESTT00000065989		18	75989961	75992868
A10	ENSESTT00000052575		18	76004909	76006133
A10	ENST00000314741	PARD6G	18	76016631	76104208
A10	ENSESTT00000052576		18	76016997	76104406
A10	ENSESTT00000052577		18	76039710	76059638
A11	ENST00000319217.1	MPDZ	9	13096497	13240357
A11	ENST00000319198.3	MPDZ	9	13096497	13240357
A11	ENST00000276902.1	NFIB	9	14077605	14297550
A11	ENST00000331870.1		9	14194247	14194570
A11	ENST00000324876.2	NM_178566	9	14607036	14683474
A11	ENST00000276911.1	CER1	9	14710088	14712670
A11	ENST00000297595.3	NM_144966	9	14727207	14900993
A11	ENST00000324457.3	NM_144966	9	14727207	14900993
A11	ENST00000297593.1	NM_144966	9	14727207	14900993

TABLE 3 (Continued)

A11	ENST000000297615.2	NM_152574	9	15161561	15297250
A11	ENST000000336042.1	NM_152574	9	15161561	15297250
A11	ENST000000297627.1	SNAPC3	9	15412732	15455830
A11	ENST000000336277.1	SNAPC3	9	15412732	15455830
A11	ENST000000297635.1	PSIP2	9	15454067	15500982
A11	ENST000000285482.4		9	15542895	15613411
A11	ENST000000297641.1	NM_173550	9	15734586	15961895
A11	ENST000000318677.2	NM_173550	9	15734586	15961895
A11	ENST000000309604.2	NM_017637	9	16408579	16427061
A11	ENST000000317612.2	NM_017637	9	16408579	16427061
A11	ENST000000316584.1	NM_152576	9	16517183	16517287
A11	ENST000000297642.1	NM_017738	9	17125064	17485003
A11	ENST000000262360.2	NM_017738	9	17125064	17485003

WHAT IS CLAIMED IS:

1. A method for identifying an antineoplastic agent, comprising:
  - (a) contacting a test compound with a cell that expresses one or more  
5 amplicons of Table 2 having an amplification ratio of at least 2.0; and
  - (b) determining a change in said amplification ratio due to said  
contacting;  
wherein a change in said amplification ratio due to said contacting  
indicates that said test compound has gene modulating activity  
10 thereby identifying said test compound as a gene modulating agent.
2. The method of claim 1 wherein said change in expression is a  
decrease in expression.
- 15 3. The method of claim 2 wherein said decrease in expression is a  
decrease in copy number of the gene.
4. The method of claim 1 wherein said cell was genetically engineered  
to express said amplicon.  
20
5. A method for identifying an antineoplastic agent, comprising:
  - (a) contacting a test compound with a cell that expresses at least one  
gene corresponding to a polynucleotide comprising a nucleotide sequence of  
SEQ ID NO: 1 - 3049 and under conditions promoting expression of said  
25 gene; and
  - (b) determining a change in expression of said gene as a result of said  
contacting  
wherein a change in expression indicates gene modulation thereby  
identifying said test compound as a gene modulating agent.  
30
6. The method of claim 5 wherein said change in expression is a  
decrease in expression.

7. The method of claim 5 wherein said decrease in expression is a decrease in copy number of the gene.

8. The method of claim 5 wherein said gene comprises a nucleotide  
5 sequence of one of SEQ ID NO: 1 – 3049.

9. The method of claim 5 wherein said cell was genetically engineered to express said gene.

10 10. A method for detecting the cancerous status of a cell, comprising detecting elevated expression in said cell of at least one gene corresponding to a polynucleotide comprising a nucleotide sequence of SEQ ID NO: 1 – 3049 whereby such elevated expression is indicative of cancerous status of the cell.

15

11. The method of claim 10 wherein said elevated expression is an elevated copy number of the gene.

12. A method for identifying a compound as an anti-neoplastic agent,  
20 comprising:

(a) contacting a test compound with a polypeptide encoded by a gene selected from SEQ ID NO: 1 – 3049,

(b) determining a change in a biological activity of said polypeptide due to said contacting,

25 wherein a change in activity indicates anti-neoplastic activity and thereby identifies such test compound as an agent having antineoplastic activity.

13. The method of claim 12 wherein said change in biological activity is  
30 a decrease in biological activity.

14. The method of claim 12 wherein said biological activity is an enzyme activity.

15. The method of claim 14 wherein said enzyme is selected from kinase, protease, peptidase, phosphodiesterase, phosphatase, dehydrogenase, reductase, carboxylase, transferase, deacetylase and polymerase.

16. The method of claim 15 wherein said kinase is a protein kinase.

17. The method of claim 15 wherein said kinase is a serine or threonine kinase.

18. The method of claim 15 wherein said kinase is a receptor tyrosine protein kinase.

19. The method of claim 15 wherein said protease is a serine protease, cysteine protease or aspartic acid protease.

20. The method of claim 15 wherein said transferase is a methyltransferase.

21. The method of claim 20 wherein said methyl transferase is a cytidine methyltransferase or an adenine methyltransferase.

22. The method of claim 15 wherein said deacetylase is a histone deacetylase.

23. The method of claim 11 wherein said carboxylase is a  $\gamma$ -carboxylase.

24. The method of claim 15 wherein said peptidase is a zinc peptidase.

25. The method of claim 15 wherein said polymerase is a DNA polymerase.

26. The method of claim 15 wherein said polymerase is a RNA  
5 polymerase.

27. The method of claim 12 wherein said biological activity is a membrane transport activity.

10 28. The method of claim 12 wherein said polypeptide is a cation channel protein, an anion channel protein, a gated-ion channel protein or an ABC transporter protein.

29. The method of claim 12 wherein said polypeptide is an integrin.  
15

30. The method of claim 12 wherein said polypeptide is a Cytochrome P450 enzyme.

31. The method of claim 12 wherein said polypeptide is a nuclear  
20 hormone receptor.

32. The method of claim 12 wherein said biological activity is a receptor activity.

25 33. The method of claim 12 wherein said receptor is a G-protein-coupled receptor.

34. The method of claim 12 wherein said polypeptide is contained in a cell.  
30

35. A method for identifying an anti-neoplastic agent comprising contacting a cancerous cell with a compound found to have anti-neoplastic



activity in the method of claim 12 under conditions promoting the growth of said cell and detecting a change in the activity of said cancerous cell.

36. The method of claim 35 wherein said change in activity is a decrease in the rate of replication of said cancerous cell.

5

37. The method of claim 35 wherein said change in activity is a decrease in the total number of progeny cells that can be produced by said cancerous cell.

10

38. The method of claim 35 wherein said change in activity is a decrease in the number of times said cancerous cell can replicate.

39. The method of claim 35 wherein said change in activity is the death of said cancerous cell.

15

40. A method for treating cancer comprising contacting a cancerous cell with an agent first identified as having gene modulating activity using the method of claim 1, 5, or 12 and in an amount effective to cause a reduction in cancerous activity of said cell.

20

41. The method of claim 40 wherein said cancerous cell is contacted *in vivo*.

25

42. The method of claim 40 wherein said reduction in cancerous activity is a decrease in the rate of proliferation of said cancerous cell.

43. The method of claim 40 wherein said reduction in cancerous activity is the death of said cancerous cell.

30

44. The method of claim 40 wherein said cancer is a cancer of breast, colon, lung or prostate tissues.

45. A method for treating cancer comprising contacting a cancerous cell with an agent having affinity for an expression product of a gene corresponding to a polynucleotide comprising a nucleotide sequence of SEQ ID NO: 1 – 3049 and in an amount effective to cause a reduction in cancerous activity of said cell.

46. The method of claim 45 wherein said expression product is a polypeptide.

47. The method of claim 45 wherein said agent is an antibody.

48. A method for monitoring the progress of cancer therapy in a patient comprising monitoring in a patient undergoing cancer therapy the expression of a gene corresponding to a polypeptide having a sequence selected from SEQ ID NO: 1 – 3049.

49. The method of claim 48 wherein said gene comprises a sequence of SEQ ID NO: 1 – 3049.

50. The method of claim 48 wherein said cancer therapy is chemotherapy.

51. The method of claim 48 wherein said cancer is a cancer of breast, colon, lung or prostate tissues.

52. A method for determining the likelihood of success of cancer therapy in a patient, comprising monitoring in a patient undergoing cancer therapy the expression of a gene corresponding to a polynucleotide having a sequence of one of SEQ ID NO: 1 – 3049 wherein a decrease in said expression prior to completion of said cancer therapy is indicative of a likelihood of success of said cancer therapy.

53. The method of claim 52 wherein said gene comprises a sequence of SEQ ID NO: 1-3049.

54. The method of claim 52 wherein said cancer therapy is  
5 chemotherapy.

55. The method of claim 52 wherein said cancer is a cancer of breast, colon, lung or prostate tissues.

10 56. A method for producing test data with respect to the anti-neoplastic activity of a compound comprising:

(a) identifying a test compound as having anti-neoplastic activity using a method of claim 12;

(b) producing test data with respect to the anti-neoplastic activity of  
15 said test compound sufficient to identify the chemical structure of said test compound.

57. A method for determining the progress of a treatment for cancer in a patient afflicted therewith, following commencement of a cancer treatment  
20 on said patient, comprising:

(a) determining in said patient a change in expression of one or more genes corresponding to a polynucleotide comprising a nucleotide sequence of SEQ ID NO: 1 – 3049; and

(b) determining a change in expression of said gene compared to  
25 expression of said one or more determined genes prior to commencement of said cancer treatment;

wherein said change in expression indicates progress of said treatment thereby determining the progress of said treatment.

30 58. The method of claim 57 wherein said change in expression is a decrease in expression and said decrease indicates success of said treatment.

59. A method for determining the progress of a treatment for cancer in a patient afflicted therewith, following commencement of a cancer treatment on said patient, comprising:

5       (a) determining in said patient a change in expression of one or more genes corresponding to a polynucleotide comprising a nucleotide sequence of SEQ ID NO: 1 – 3049; and

      (b) determining a change in expression of said gene compared to expression of said one or more determined genes prior to commencement of  
10   said cancer treatment;

      wherein said change in expression indicates progress of said treatment thereby determining the progress of said treatment.

60. The method of claim 59 wherein said change in expression is a  
15   decrease in expression and said decrease indicates success of said treatment.

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US05/07748

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) : C12Q 1/68; C07H 21/04

US CL : 435/6; 536/23.1, 23.5

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 435/6; 536/23.1, 23.5

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
Please See Continuation Sheet

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5,776,683 A (SMITH et al) 07 July 1998 (07.07.1998), especially col. 6, 25 and Table 7.	1-4
Y	SQUIRE et al. High-resolution mapping of amplifications and deletions in pediatric osteosarcoma by use of CGH analysis of cDNA microarrays. Genes, Chromosomes & Cancer. 2003, Vol. 38, pages 215-225, especially page 216 and Table 1.	1-4

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"B" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

18 January 2006 (18.01.2006)

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US  
Commissioner for Patents  
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Date of mailing of the international search report

21 FEB 2006

Authorized officer

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# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US05/07748

## Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:  
Please See Continuation Sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of any additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.: 1-4, with respect to the amplicon comprising chromosome 8q24.13

Remark on Protest ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

☐

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/US05/07748

### BOX III. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be searched, the appropriate additional examination fees must be paid.

Groups 1-47, claims 1-4 (in part), drawn to methods for identifying an antineoplastic agent by contacting a test compound with a cell containing one of the 47 amplicons set forth in Table 2. For example, Group 1 is drawn to methods for identifying an antineoplastic agent by contacting a test compound with a cell containing the 5.3 MB amplicon comprising chromosome 8q24.13. Upon election of one of the groups, please specify the amplicon to be searched.

Groups 48-3097, claims 5-9 (in part), drawn to methods for identifying an antineoplastic agent by contacting a test compound with a cell containing one of the sequences of SEQ ID NO: 1-3049 and assaying for a change in the level of expression of one of the sequences. For example, Group 48 is drawn to methods for identifying an antineoplastic agent by contacting a test compound with a cell containing SEQ ID NO: 1. Upon election of one of the groups, please specify the SEQ ID NO of the elected group to be searched.

Groups 3098-6147, claims 10-11 (in part), drawn to methods for identifying a cancerous state of a cell by assaying for the sequence of one of SEQ ID NO: 1-3049. Upon election of one of the groups, please specify the SEQ ID NO of the elected group to be searched.

Groups 6148-9196, claims 12-34 (in part), drawn to methods for identifying an antineoplastic agent by contacting a test compound with a cell containing a polypeptide encoded by one of the sequences of SEQ ID NO: 1-3049 and assaying for a change in the activity of the polypeptide. Upon election of one of the groups, please specify the SEQ ID NO of the elected group to be searched. Further, it is noted that claim 23 has been included with this grouping because it appears that claim 23 intends to depend from claim 15, rather than claim 11.

Groups 9197-12,245, claims 35-39 (in part), drawn to methods for identifying an antineoplastic agent by contacting a test compound with a cell containing one of the sequences of SEQ ID NO: 1-3049 and assaying for a change in the cancer cell growth of said cell. Upon election of one of the groups, please specify the SEQ ID NO of the elected group to be searched.

Groups 12,246-15,294, claims 40-47 (in part), drawn to methods for treating cancer by using a compound that effects the activity of a polypeptide encoded by one of the sequences of SEQ ID NO: 1-3049. Upon election of one of the groups, please specify the corresponding SEQ ID NO of the elected group to be searched.

## INTERNATIONAL SEARCH REPORT

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Groups 15295-18343, claims 48-55 and 57-60 (in part), drawn to methods for monitoring the progress of a cancer therapy by assaying for the level of a polypeptide encoded by one of the sequences of SEQ ID NO: 1-3049. Upon election of one of the groups, please specify the SEQ ID NO of the elected group to be searched.

Groups 18,344-21,392, claim 56 (in part), drawn to methods for producing data comprising producing test data sufficient to identify the chemical nature of a test compound that effects the activity of a polypeptide encoded by one of the sequences of SEQ ID NO: 1-3049. Upon election of one of the groups, please specify the SEQ ID NO of the elected group to be searched.

The inventions listed as Groups 1-21,392 do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

In accordance with 37 CFR 1.475(d) Applicant is entitled to an examination of the first product, method of making said product and method of using said product. In the instant case, the first method is one which requires one of the 47 amplicons of Table 2. This product is not required for the methods set forth in the remaining groups. Thereby, Groups 48-21,392 constitute distinct groups which do not share the same corresponding technical feature of groups 1-47. Further, unity of invention exists only when there is a technical relationship among those inventions involving one or more of the same or corresponding technical features. The expression "special technical feature" means those technical features that define a contribution which each of the claimed inventions, considered as a whole, makes over the prior art. The technical feature linking the claims 5-60 is the HAS2 gene. However, the HAS2 gene was known in the art at the time the invention was made and thereby does not constitute a contribution over the prior art (see NCBI Database, GenBank Accession No. U54804). Accordingly, there is no special technical feature linking the recited groups, as would be necessary to fulfill the requirement for unity of invention.

It is also noted that each of the present claims has been presented in improper Markush format, as distinct methods are improperly joined in the claims. Each amplicon of Table 2 and each nucleic acid sequence of SEQ ID NO: 1-3049 is structurally and functionally distinct from and has a different special technical feature than each other the amplicons and nucleic acid sequences. The chemical structure of each amplicon and nucleic acid sequence differ from each other. For example, a polynucleotide comprising SEQ ID NO: 1 is chemically, structurally, and functionally different from a molecule comprising SEQ ID NO: 2. Given the differences in the structure, function and effect the amplicons of Table 2 and the sequences of SEQ ID NO: 1-3049, these compounds are not considered to share a special technical feature as would be necessary to fulfill the requirement for unity of invention. These distinct compounds do not have both a "common property or activity" and a common structure as would be required to show that the inventions are "of a similar nature." As the products and methods encompassed by the claims do not share a special technical feature, the distinct products and methods may not properly be presented in the alternative. Accordingly, the claims have been separated into a number of groups corresponding to the number of different inventions encompassed by the claims, and the claims will be searched only as they read upon the invention of the elected group.

Additionally, each of the claimed methods have different objectives and require different process steps. The methods of claims 1-4 require cells containing one of the amplicons of Table 2 and requires assaying for a change in the amplification ratio of the amplicon. The methods of claims 5-9 require the use cells that contain one of the sequences of SEQ ID NO: 1-3049, and requires assaying for a change in gene expression by assaying for mRNA or protein levels in order to accomplish the objective of identifying an antineoplastic agent. The methods of claims 10-11 require assaying for the level of one of the sequences of SEQ ID NO: 1-3049 in order to accomplish the objective of identifying a cancerous state of a cell. The methods of claims 12-34 require contacting a cell with a test agent and assaying for a change in biological activity of a polypeptide encoded by SEQ ID NO: 1-3049. The methods of claims 35-39 require contacting a cell with a test compound and assaying for the cancerous state of a cell. The methods of claims 40-47 require administering an agent to an individual in order to accomplish the objective of treating cancer. The methods of claims 48-55 and 57-60 require determining gene expression levels of a polypeptide of one of SEQ ID NO: 1-3049 and assaying for polypeptide levels in order to accomplish the objective of monitoring the progress of cancer therapy. The method of claim 56 requires identifying test compounds that have



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antineoplastic activity and producing test data in order to obtain sufficient data to identify the chemical structure of the test compound. In addition to differences in objectives, effects, and method steps, it is again noted that the claims of the present Groups are not directed to the detection or identification of molecules having the same or common special technical feature, for the reasons discussed above.

Continuation of B. FIELDS SEARCHED Item 3:

WEST: USPT, JPAB, EPAB, DWPI, PGPUB; DIALOG: MEDLINE, CA, BIOSIS, EMBASE

search terms: 8q24.13, 8q24.1; amplification or amplified or copy number; cancer or tumor or neoplasm